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FINAL

DEFENSE DISTRIBUTION DEPOT SAN JOAQUIN (DDJC), TRACY SITE
TRACY, CALIFORNIA

SITE-WIDE COMPREHENSIVE RECORD OF DECISION

VOLUME 1 OF 2
(TEXT)

<IMG SRC 98030B>

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
COC	Chemical of Concern
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
DCC	Day Care Center
1,1-DCE	1,1-dichloroethene
1,2-DCE	1,2-dichlcroethene
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodephenyldichloroethene
DDJC	Defense Distribution Depot San Joaquin
DDRW	Defense Distribution Region West
DDT	Dichlorodlephenyltrichloroethane
DDTR	DDD, DDE, and DDT
DHS	Department of Health Services
DI WET	De-Ionized Water-Waste Extraction Tests
DLA	Defense Logistics Agency
DoD	Department of Defense
DSERTS	Defense Site Environmental Reporting and Tracking System
DTSC	Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
EQP	Equilibrium Partitioning
ERA	Ecological Risk Assessment
ESD	Explanation of Significant Differences
EU	Exposure Unit
FFA	Federal Facilities Agreement
FS	Feasibility Study
GAC	Granular Activated Carbon
gpm	gallons per minute
HHRA	Human Health Risk Assessment
HI	hazard index
ILCR	Increased Lifetime Cancer Risk
IRM	Interim Remedial Measure
IRP	Installation Restoration Program
IWPL	Industrial Waste Pipeline
LOEL	Lowest Observable Effect Level
LUFT	Leaking Underground Fuel Tank
MCL	maximum contaminant level
MEK	methyl ethyl ketone
mg/Kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
mph	miles per hour
msl	mean sea level
NC	not calculated
NCP	National Contingency Plan
NFA	No Further Action
NOAEL	no observable adverse effect level
NOEL	no observable effect level
NPL	National Priorities List
O&M	operations and maintenance
OP	organophosphorus
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCP	pentachlorophenol
POW	Prisoner of War
ppb	parts per billion
ppbv	parts per billion volume
ppm	parts per million
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan

RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RI/RA	Remedial Investigation/Risk Assessment
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SAL	state action level
SARA	Superfund Amendments and Reauthorization Act
SCFM	standard cubic feet per minute
SL	slope factor
STLC	soluble threshold limit concentration
SVE	soil vapor extraction
SVOCS	semivolatile organic compounds
SWMU	Solid Waste Management Unit
SWRCB	State Water Resources Control Board
TCE	trichloroethene
TCPA	temporary children's play area
TPH	total petroleum hydrocarbons
TPHD	total petroleum hydrocarbons as diesel
TPHG	total petroleum hydrocarbons as gasoline
TPH-MO	total petroleum hydrocarbons as motor oil
U.S. EPA	United States Environmental Protection Agency
UCL	upper confidence limit
Ig/dl	micrograms per deciliter
Ig/L	micrograms per Liter
USACE	U.S. Army Corps of Engineers
USAEHA	U.S. Army Environmental Hygiene Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USC	United States Code
UST	Underground Storage Tank
VOC	volatile organic compound
WCC	Woodward Clyde Consultants
WDR	Waste Discharge Requirements
WMP	Well Monitoring Program
WQSA	Water Quality Site Assessment

DECLARATION FOR THE RECORD OF DECISION

D.1 Site Name and Location

Defense Depot San Joaquin (DDJC)-Tracy,
Tracy, California.

D.2 Statement of Basis and Purpose

D.2.1 This decision document presents the selected remedial action for the DDJC-Tracy Site in Tracy, California, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments with Reauthorization Act (SARA). The selected action is also in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300) and Chapter 6.8 of the California Health and Safety Code (Section 25300 et seq.). Further, these actions are being taken in response to the California Water Code (Section 13300 et seq.). The selection of remedies is based on the administrative record for this site.

D.2.2 The U.S. Environmental Protection Agency (U.S. EPA) and the State of California concur on the selected remedies.

D.3 Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

D.4 Description of the Remedy

D.4.1 This Comprehensive ROD is the final action for DDJC-Tracy. An earlier ROD, covering Operable Unit 1 (OU 1), involved remediation of volatile organic compounds (VOCs) in groundwater. This ROD includes a comprehensive evaluation of all groundwater issues and addresses all sites with soil contamination.

D.4.2 Twenty-one sites are recommended for no further action. Sixteen on-depot sites were considered for further action in the feasibility study (Montgomery Watson, 1996a). The selected remedies for each of the sites are summarized in Table D-1. A description of the selected remedies for sites requiring action is provided in Table D-2.

D.5 Statutory Determinations

D.5.1 The selected remedies are protective of human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and are cost-effective. These remedies use permanent solutions where possible and satisfy, to the extent practicable, the statutory preference for remedies that employ treatment and reduce toxicity, mobility, or volume as a principal element. The remedies for SWMUs 2/3, SWMU 4, SWMU 6, SWMU 7, SWMU 8, SWMU 27, SWMU 33, Drum Storage Area/Building 30, the Day Care Center, and Northern Depot Area soils do not include treatment. Because treatment of the principal threats at these sites was not found to be practicable, the remedies for these sites do not satisfy the statutory preference for treatment. Institutional Controls were selected for SWMU 7 and Drum Storage Area/Building 30 because potential threats to groundwater quality have not been confirmed through historical modeling. Paving was selected as a remedy for Northern Depot Area soils to prevent depot workers in this active storage area from being exposed to contaminated surface soils.

D.5.2 Five-year reviews will be conducted in accordance with CERCLA Section 121(c). The five-year review is required for sites with institutional controls that restrict use and for sites (i.e., groundwater) where cleanup standards will not be attained within five years. Five-year reviews will also be required for sites where contaminants remain in place, unless it can be shown that they pose no further threat to human health and the environment.

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Table D-1. Selected Remedy for Each Site at DDJC-Tracy

DSERTS Number	Solid Waste Management Area/Soil Area	Selected Remedy
31	OU 1 Groundwater	Groundwater Extraction, Treatment, Injection and Monitoring
1	SWMU 1/Area 2	Soil Vapor Extraction and Monitoring
2/3	SWMU 2/3	Excavation with Off-Site Disposal and Monitoring
4	SWMU 4	Excavation with Off-Site Disposal of Sediments, Installation of Sediment Controls and Monitoring
5	SWMU 5	No Further Action
6	SWMU 6	Excavation with Off-Site Disposal and Monitoring
7	SWMU 7	Institutional Controls and Monitoring
8	SWMU 8	Excavation with Off-Site Disposal and Monitoring
9	SWMU 9	No Further Action
10	SWMU 10	No Further Action
3/3	SWMU 10A	No Further Action
11	SWMU 11	No Further Action
12	SWMU 12	No Further Action
14	SWMU 14	No Further Action
15	SWMU 15	No Further Action
16	SWMU 16	No Further Action
20	SWMU 20	Soil Vapor Extraction, Limited Excavation with Off-Site Disposal, Natural Attenuation, and Monitoring
21	SWMU 21	No Further Action
22	SWMU 22	No Further Action
23	SWMU 23	No Further Action
24	SWMU 24	Bioventing and Monitoring
25	SWMU 25	No Further Action
27	SWMU 27/Area 1	Excavation with Off-Site Disposal and Monitoring
29	SWMU 29	No Further Action
30	SWMU 30	No Further Action
70	SWMU 31	No Further Action
65	SWMU 33	Pipe Grouting, Limited Excavation, Institutional Controls, and Monitoring
64	SWMU 64	No Further Action
N/A	Area 1 Building 236	No Further Action
66	Area 1 Building 237	Soil Vapor Extraction and Monitoring
68	Area 3	Soil Vapor Extraction and Monitoring
N/A	Building 15 Drum Storage Area	No Further Action
N/A	Building 22 Drum Storage Area	No Further Action
N/A	Building 23	No Further Action
69	Building 30 Drum Storage Area	Monitoring
67	Depot Wide Surface and Near Surface Soils, Northern Depot Area	Asphalt Cover
N/A	Day Care Center	Excavation with Off-Site Disposal

DDJC = Defense Depot San Joaquin
DSERTS = Defense Site Environmental Reporting and Tracking System
SWMU = Solid Waste Management Unit
N/A = not applicable

Table D-2. Detailed Components of Selected Remedies for Sites Requiring Action

Solid Waste Management Area/Soil Area	Components
OU 1 Groundwater	Extraction wells (including 7 new wells to capture dieldrin) Air stripper for VOC removal Wellhead granular activated carbon for pesticides Injection facilities Compliance monitoring
SWMU 1/Area 2	Soil vapor extraction (approximately 10 wells) Compliance monitoring of groundwater
SWMUs 2/3	Excavation (approximately 10,000 cubic yards) Off-site disposal Supply 3 inches of clean backfill and a geofabric material to protect ecological receptors (pending additional risk assessment) Compliance monitoring of groundwater
SWMU 4	Excavation (approximately 2,500 cubic yards) Off-site disposal Supply 3 inches of clean backfill and a geofabric material to protect ecological receptors (pending additional risk assessment) Construct overflow weir and install sediment trap on northern pond inlet Compliance monitoring of groundwater and surface water
SWMU 6	Excavation (approximately 100 cubic yards) Compliance monitoring
SWMU 7	Land-Use Restrictions for Buildings 19 and 21 Two additional monitoring wells Compliance monitoring
SWMU 8	Excavation (approximately 8,000 cubic yards) One additional monitoring well Compliance monitoring
SWMU 20	Soil vapor extraction (approximately 2 wells) Excavation (approximately 510 cubic yards) Off-site disposal Compliance monitoring
SWMU 24	Bioventing (approximately 1 well) Compliance monitoring
SWMU 27/Area 1	Excavation (approximately 130 cubic yards) Off-site disposal Compliance monitoring
SWMU 33	Limited excavation (approximately 10 cubic yards) Off-site disposal Pipe grouting Institutional controls Compliance monitoring
Area 1 Building 237	Soil vapor extraction (approximately 5 wells) Compliance monitoring
Area 3	Soil vapor extraction (approximately 8 wells) Compliance monitoring
Building 30 Drum Storage Area	Compliance monitoring
Northern Depot Area	Asphalt cover

DS.0 DECISION SUMMARY

The Decision Summary is the second and main component of the Record of Decision. It discusses the site characteristics, the alternatives evaluated, and the selected remedy. The Decision Summary also explains how the selected remedy fulfills statutory requirements. The Decision Summary comprises eleven sections:

- Section 1.0: Site Description;
- Section 2.0: Site History and Enforcement Activities;
- Section 3.0: Highlights of Community Participation;
- Section 4.0: Scope and Role of the Response Action;
- Section 5.0: Summary of Site Characteristics;
- Section 6.0: Summary of Site Risks;
- Section 7.0: Description of Alternatives;
- Section 8.0: Comparative Analysis of Alternatives;
- Section 9.0: Selected Remedies;
- Section 10.0: Statutory Determinations; and
- Section 11.0: References.

The purpose of each of these sections is briefly described below. All tables and figures are provided at the end of each section.

DS.1 SECTION 1.0: SITE DESCRIPTION

This section provides a general overview of the site. Major surface and subsurface features, the local geography, and topography are summarized. The adjacent land use and nearby populations are also discussed.

DS.2 SECTION 2.0: SITE HISTORY AND ENFORCEMENT ACTIVITIES

A phased approach was used by Defense Depot San Joaquin (DDJC)-Tracy to address issues under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This section summarizes the various investigations and corrective actions that have taken place (see Figure 2-4). Table 2-1 summarizes the past waste handling and disposal practices at DDJC-Tracy. Table 2-2 summarizes the present status of each of the sites.

DS.3 SECTION 3.0: HIGHLIGHTS OF COMMUNITY PARTICIPATION

This section documents public notices and participation in the CERCLA process. The notice and public meeting regarding the Proposed Plan (Montgomery Watson, 1997a) are discussed in particular. Further details are provided in the Responsiveness Summary.

DS.4 SECTION 4.0: SCOPE AND ROLE OF THE RESPONSE ACTION

This section defines the scope and role of this Record of Decision. This is a comprehensive Record of Decision that addresses all contaminants in all media. The decision of a previous Record of Decision for Operable Unit 1 (groundwater) is modified and reaffirmed in this Record of Decision. All soil issues are also addressed.

DS.5 SECTION 5.0: SUMMARY OF SITE CHARACTERISTICS

This section summarizes the nature and extent of contamination at each of the sites. Areas of groundwater contamination are identified along with their suspected sources. Each Solid Waste

Management Unit (SWMU) and soil area is described, contaminants are identified; and impacts to groundwater, human health, and ecological receptors are identified.

DS.6 SECTION 6.0: SUMMARY OF SITE RISKS

This section discusses how contaminants of concern (COCs) were identified and provides the basis for determining appropriate cleanup standards. Sections 6.1 through 6.5 summarize the human health risk assessment. Both carcinogenic and non-carcinogenic health risks are discussed. Section 6.6 discusses risks to ecological receptors (plants and animals). In Section 6.7, impacts to beneficial uses and background groundwater quality are discussed. Sites that require remediation to address threats to human health, ecological receptors, and water quality are identified in each of the respective subsections outlined above.

DS.7 SECTION 7.0: DESCRIPTION OF ALTERNATIVES

This section begins with a general discussion of Applicable or Relevant and Appropriate Requirements (ARARs) and other non-promulgated guidance To Be Considered (TBCs). These regulations and guidance were used in the development of alternatives to address the sites at DDJC-Tracy. Remedial action objectives are identified for each site and alternatives are developed in this section. Table 7-1 summarizes the screening of chemicals of potential concern (COPCs) in groundwater and the remedial decision for these chemicals. The treatment components, containment or storage components, groundwater components, general components, and major ARARs are identified in Tables 7-2 through 7-14. Table 7-15 provides the rationale for soil sites where no further action is recommended.

DS.8 SECTION 8.0: COMPARATIVE ANALYSIS OF ALTERNATIVES

Nine evaluation criteria are used to evaluate alternatives for CERCLA sites. These criteria are:

DS.8.1 Threshold Criteria

- Overall protection of human health and the environment; and
- Compliance with ARARs.

DS.8.2 Primary Balancing Criteria

- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume through treatment;
- Short-term effectiveness;
- Implementability; and
- Cost.

DS.8.3 Modifying Criteria

- State support and agency acceptance; and
- Community acceptance.

Each alternative was evaluated against these nine criteria. This evaluation is summarized in Section 8.0.

DS.9 SECTION 9.0: SELECTED REMEDIES

This section describes the selected remedies. Points of compliance and remediation goals (i.e., cleanup standards) are identified, along with the basis for the remediation goals. The capital and operation and maintenance cost for each selected action is provided.

DS.10 SECTION 10.0: STATUTORY DETERMINATIONS

CERCLA Section 121 has five statutory requirements. The selected remedy selected by the lead agency must:

- Be protective of human health and the environment;
- Comply with ARARs (or justify a waiver);
- Be cost effective;
- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- Satisfy the preference for treatment that reduces toxicity, mobility, or volume as a principal element, or provide an explanation as to why this preference was not satisfied.
- Each selected remedy was compared to these requirements and a detailed evaluation of ARARs is provided in Section 10.0.

DS.11 SECTION 11.0: REFERENCES

This section provides a list of references.

DS.12 SITE-SPECIFIC CROSS REFERENCES

Table DS-1 is designed to assist the reader who is only interested in one or a few sites at DDJC-Tracy. The reader should first locate the site of interest in the table rows. The columns specify the major topics addressed in the ROD and the specific sections and tables that the reader should consult for information on those topics.

Table DS-1. Major Topics by Site

Site	Past Site Activities	Site Characterization Summary	Human Risks	Ecological Risks	Threats to Groundwater	Remedial Alternatives	Comparison of Remedial Alternatives	Selected Remedy	How Selected Remedy Meets Statutory Requirements
OU 1 Groundwater	Sections 2.2.1-2.2.5	Section 5.2	Table 2-2, 6-8	Table 2-2	Sections 2.2.1-2.2.5	Section 7.3, Table 7-1, 7-2	Section 8.2, Table 8-2	Section 9.5	Section 103
GROUP A									
SWMU 1/ Area 2	Section 5.4.1 Table 2-1	Section 5.4.1	Section 5.4.1 Table 2-2, 6-4, 6-5	Section 5.4.1	Section 5.4.1 Table 6-9	Section 7.4, Table 7-3	Section 8.3, Table 8-2	Section 9.6	Section 10.4
Area 1 Building. 237	Section 5.4.2 Table 2-1	Section 5.4.2	Section 5.4.2 Tables 2-2, 6-5, 6-6	Section 5.4.2	Section 5.4.2 Table 6-9	Section 7.4, Table 7-3	Section 8.3, Table 8-2	Section 9.6	Section 10.4
Area 3 Drum Storage Area	Section 5.4.3 Table 2-1	Section 5.4.3	Section 5.4.3 Tables 2-2, 6-7	Section 5.4.3	Section 5.4.3 Table 6-9	Section 7.4, Table 7-3	Section 8.3, Table 8-2	Section 9.6	Section 10.4
GROUP B									
SWMU 4 - Storm Drain Lagoon	Section 5.5.1 Table 2-1	Section 5.5.1	Section 5.5.1 Tables 2-2, 6-4, 6-5	Section 6.6.5.4	Section 5.5.1 Table 6-9	Section 7.5.1, Table 7-4	Section 8.4.1, Table 8-2	Section 9.7.1	Section 10.5
SWMU 6 - Building 28 Sump	Section 5.5.2 Table 2-1	Section 5.5.2	Section 5.5.2 Tables 2-2, 6-7	Section 5.5.2	Section 5.5.2 Table 6-9	Section 7.5.2, Table 7-5	Section 8.5, Table 8-2	Section 9.7.2	Section 10.6
SWMU 7 - Burn Pit No. 1	Section 5.5.3 Table 2-1	Section 5.5.3	Section 5.5.3 Table 2-2	Section 5.5.3	Section 5.5.3 Table 6-9	Section 7.5.3, Table 7-6	Section 8.6, Table 8-2	Section 9.7.3	Section 10.7
SWMU 8 - Burn Pit No. 2	Section 5.5.4 Table 2-1	Section 5.5.4	Section 5.5.4 Tables 2-2, 6-7, 6-8	Section 5.5.4	Section 5.5.4 Table 6-9	Section 7.5.4, Table 7-7	Section 8.7, Table 8-2	Section 9.7.4	Section 10.8
SWMU 20 - Aboveground Solvent Tank/Bldg. 26 Recoup operations	Section 5.5.5 Table 2-1	Section 5.5.5	Section 5.5.5 Tables 2-2, 6-6	Section 5.5.5	Section 5.5.5 Table 6-9	Section 7.5.5, Table 7-8	Section 8.8	Section 9.7.5	Section 10.9

Table DS-1. (Continued)

Site	Past Site Activities	Site Characterization Summary	Human Risks	Ecological Risks	Threats to Groundwater	Remedial Alternatives	Comparison of Remedial Alternatives	Selected Remedy	How Selected Remedy Meets Statutory Requirements
SWMU 24 - Petroleum Waste Oil Tank	Section 5.5.6 Table 2-1	Section 5.5.6	Section 5.5.6 Tables 2-2, 6-4, 6-5, 6-8	Section 5.5.6	Section 5.5.6 Table 6-9	Section 7.5.6, Table 7-9	Section 8.9	Section 9.7.6	Section 10.10
SWMU 27 - Area 1 Bldg. 206	Section 5.5.7 Table 2-1	Section 5.5.7	Section 5.5.7 Tables 2-2, 5-6, 6-8	Section 5.5.7	Section 5.5.7 Table 6-9	Section 7.5.8, Table 7-10	Section 8.10	Section 9.7.7	Section 10.11
Bldg. 30 Drum Storage Area	Section 5.5.8 Table 2-1	Section 5.5.8	Section 5.5.8 Table 2-2	Section 5.5.8	Section 5.5.8 Table 6-9	Section 7.5.8, Table 7-11	Section 8.11	Section 9.7.8	Section 10.12
Northern Depot Area	Section 5.5.9 Table 2-1	Section 5.5.9	Section 5.5.9 Tables 2-2, 6-4, 6-5, 6-8	Section 5.5.9	Section 5.5.9 Table 6-9	Section 7.5.9, Table 7-12	Section 8.12	Section 9.7.9	Section 10.13
GROUP C									
SWMUs 213 - Sewage Lagoons and Ind. Waste Lagoon	Sections 2.1.2, 5.6.1, 5.6.2 Table 2-1	Section 5.6.1, 5.6.2	Section 5.6.1, 5.6.2 Tables 2-2, 6-4, 6-5	Section 6.6.5.3	Section 5.6.1, 5.6.2 Table 6-9	Section 7.6.1 Table 7-13	Section 8.13	Section 9.8.1	Section 10.14
SWMU 33 - Ind. Waste Pipeline	Section 5.6.3 Table 2-1	Section 5.6.3	Section 5.6.3 Tables 2-2, 6-5	Section 5.6.3	Section 5.6.3 Table 6-9	Section 7.6.2, Table 7-14	Section 8.14	Section 9.8.2	Section 10.15
No Further Action Sites	Sections 5.6.1-5.6.20 Table 2-1	Sections 5.7.1-5.7.20	Sections 5.7.1-5.7.20 Table 2-2	Sections 5.7.1-5.7.20	Sections 5.7.1-5.7.20	Section 7.7, Table 7-15		Section 9.2	Section 10.1
Day Care Center	Sections 2.2.10, 5.6.21 Table 2-1	Section 5.7.21	Section 5.7.21 Tables 6-4, 6-5	Section 5.7.21	Section 5.8			Section 9.3	Section 10.1

1.0 SITE DESCRIPTION

1.1 Site Location

Defense Depot San Joaquin (DDJC)-Tracy is located in an unincorporated area of San Joaquin County, 1.5 miles southeast of Tracy, California; approximately 20 miles southwest of Stockton, California; and 60 miles east of San Francisco, California (Figure 1-1).

1.2 Facility Description

DDJC-Tracy is primarily a storage and distribution facility for various supplies common to U.S. military services in the western U.S. and throughout the Pacific. The operating portion of the depot covers a 448-acre triangular parcel, and the recently added Tracy Annex consists of 460 acres of agricultural land north of the operating portion. The topography at DDJC-Tracy is gently downward to the north-northwest from an elevation of about 115 feet above mean sea level (msl) at the southern corner to an elevation of 45 feet above msl at the northern edge of the Tracy Annex (Figure 1-1). South Chrisman Road borders the west edge of the facility, Banta Road borders the east, and Eleventh Street borders the north. About 75 percent of the operating portion is covered with buildings (primarily warehouses), asphalt, or concrete. Numerous smaller buildings in the northwest corner of the depot house administration and operations (Figure 1-2). A large storm water pond and two sewage lagoons are also located in the northwestern portion of the depot. The storm water pond receives runoff from the depot's storm drain system. The sewage lagoons receive treated wastewater from the depot's wastewater treatment plant (Figure 1-3). The only landscaped area is in the northwest corner near Building 100. All other unpaved surfaces contain weeds and grass, which historically have been removed regularly with herbicides (types and quantities were not recorded) and/or by grading.

1.3 Meteorology

DDJC-Tracy has an average annual rainfall of approximately 14 inches; over 90 percent of the rain falls between November and April. Summer temperatures commonly exceed 100 degrees Fahrenheit 5F) during the day and drop to as low as 605F at night. Winter temperatures range from 30 to 505F. The average wind speed is 10 miles per hour and blows primarily from the west in the summer and from the southeast in the winter. Dense fog often forms at night during the fall and winter.

1.4 Geology/Hydrology

1.4.1 The uppermost sedimentary deposits at DDJC-Tracy consist of the Tulare Formation and the overlying Quaternary alluvium (Table 1 - 1). The top of the Tulare Formation is eroded and overlain by essentially horizontal sandy and gravelly Pleistocene and Recent alluvium. The Tulare Formation is separated into three roughly horizontal zones: the Lower and Upper Tulare and the Corcoran Clay layers. The relatively impermeable Corcoran Clay separates (and forms an aquitard between) the poorly sorted alluvial and fluvial sediments in the Lower and Upper Tulare. The Upper Tulare and Lower Tulare layers are primary sources of fresh, inexpensive groundwater in the San Joaquin Valley, so they will hereafter be called the Upper Tulare and Lower Tulare aquifers (Montgomery Watson, 1996a).

1.4.2 The Upper Tulare aquifer has been the primary focus of remedial investigations. The water table lies approximately 10 feet below ground surface (bgs) in the northern portion of the annex and 45 feet bgs in the southern corner of the depot. The potentiometric surface (water table elevation) slopes gently toward the north-northeast. Generally, the average linear velocity of groundwater in the aquifer is an estimated 15 to 500 ft/year toward the north-northeast. The Upper Tulare Aquifer is approximately 200 feet thick near Tracy and contains fresh water under semi-confined and unconfined conditions. Some locally confined pockets exist.

1.5 Land and Water Use

1.5.1 The land surrounding DDJC-Tracy (and the Tracy Annex) is used primarily for agricultural purposes, including both irrigated cropland and pasture for livestock grazing.

1.5.2 Common farming practices in these areas include regular applications of fertilizers and pesticides. Across Chrisman Road to the west, there are five single family homes and a peach orchard. Immediately east of the depot, two major railroad lines intersect. The Northern, Pacific track runs along the northern boundary of the operating portion of the site, and the Union Pacific track runs along the southeastern boundary. There are more orchards south of the depot across the tracks, and land to the east is designated for general industrial use. Some rural residential developments exist within a three-mile radius with small areas of commercial and industrial land use (Figure 1-1).

1.5.3 The unincorporated areas of Tracy, the unincorporated community of Banta, and other rural neighborhoods are within a three-mile radius of DDJC-Tracy. In many of these areas, private wells and septic tanks provide drinking water and sewage disposal, respectively. The community of Banta, located two miles northeast of the site, includes an elementary school, about 30 residences, and commercial and industrial businesses. Another rural residential development (Stoneridge) 2.5 miles northeast of the site contains 60 residences.

1.5.4 At DDJC-Tracy, three water supply wells provide all potable water, process water, and fire water for the depot.

1.6 Cultural and Historic Resources

Southern Pacific Railroad founded the city of Tracy in 1878 and developed it as a maintenance and supply facility for trains moving to and from the San Francisco Bay area. During the 1940s, agriculture slowly became the primary industry, displacing rail transportation. The oldest buildings at DDJC-Tracy were built in 1942. During World War II, a German prisoner of war (POW) camp existed in the southern corner of the depot, but only written records, including plan drawings, of this POW camp remain. No building or location at the site is being considered for the National Registry of Historic Sites.

Table 1-1. Defense Depot San Joaquin-Tracy
Stratigraphic and Hydrostratigraphic Nomenclature

Age	Stratigraphic Units	Description	Regional Hydrostratigraphic Zones	Geologic Horizons	Horizon Description	Thickness
Quaternary (Pleistocene & Holocene)	Alluvium					
	Holocene fan and terrace deposit	Unconsolidated clay, sand, and gravel.				
	Levee deposits	Unconsolidated sand, soil, and gravel		Above Upper Horizon	Fine-grained deposits from the ground surface to a depth of 25 or 35 feet below ground surface	0-35'
	Gravel quarry spoils and disturbed ground	Gravel and sand.				
Tertiary and Quaternary (Pilocene and Pleistocene)	Tulare Formation		Upper Tulare Aquifer- Upper waterbearing zone; contains water under semiconfined and unconfined conditions.	Upper Horizon	Relatively coarse-grained deposits found between depths of 25 and 60 feet below ground surface	5'-35'
	Upper Tulare Member	Interbeded gravel, sand, silt, and clay.		Upper/Middle Aquitard	Relatively fine-grained deposits found it 50 to 70 feet below ground surface	10'-40'
		Deposited in alluvial and fluvial environments.		Middle Horizon	Relatively coarse-grained deposits found between the depths of 55 and 85 feet below ground surface in northern portions of the depot and between the depths of 75 and 115 feet below ground surface in southern portions of the depot.	5'-30'
				Middle/Lower Aquitard	Relatively fine-grained deposits found at 85 to 115 feet below ground surface	15'-35'

Table 1-1 (Continued)

Age	Stratigraphic Units	Description	Regional Hydrostratigraphic Zones	Geologic Horizons	Horizon Description	Thickness
Tertiary and Quaternary (Pilocene and Pleistocene) (Continued)	Tulare Formation (Continued)			Lower Horizon	The top of these relatively coarse-grained deposits are found at 110 feet below ground surface in northern portions of the depot and at 135 feet below ground surface in southern portions of the depot.	30'
				Geologic Unit below Lower Horizon	Relatively fine-grained deposit found below 170 feet below ground surface.	50'-60'
	Corcoran Clay Member	Sandy, clay, silty clay, silt, and clay interbedded with fine-grained sand. Deposited in a lacustrine environment.	Regional confining layer between the upper and lower water-bearing zones.	Corcoran Clay	Found at 220 feet below ground surface at the depot.	220'-250'
	Lower Tulate Member	Lenticular and interfingering beds of gravel, sand, and clay. Deposited in alluvial and fluvial environments.	Lower Tulare Aquiler-Lower water-bearing zone; contain freshwater under confined conditions to an estimated depth of 490 feet below round surface in the DDJC-Tracy Area.	Lower Tulare	Found at 430 feet to 500 feet below ground surface at the depot.	300'- 1400'

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2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Defense Logistics Agency (DLA) has operated Defense Depot San Joaquin (DDJC)-Tracy since 1942. DDJC-Tracy is a storage and distribution depot for various supplies common to U.S. military services in the western U.S. and throughout the Pacific. In late 1992, the DLA purchased approximately 460 acres north of the operating portion of DDJC-Tracy, called the Tracy Annex.

2.1 Preliminary Environmental Investigations, Records Search, and Initial Investigations

In early 1980, a records search by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) first identified 25 waste sites (solid waste management units [SWMUs], 1 through 23, 2A, and 10A) at DDJC-Tracy that contained contaminants that could migrate to off-depot locations (Figure 2-1). The study concluded that past waste disposal practices between 1940 and the mid-1970s-including the use of burning sites, underground sumps/tanks, and unlined drainage and sewage leaching ponds-caused the contamination. The available information on geology and potential contaminant sources indicated a potential for contaminants to migrate to the water table and downgradient into the sand layers of the uppermost aquifer (USATHAMA, 1980). Because of the potential for contaminants to migrate to groundwater, 12 monitoring wells (LM001AU through LM012AU) were installed in July 1980 and sampled for metals and general water quality parameters (USATHAMA, 1980). Additional analytical parameters (for example, volatile organic compounds [VOCs]) were included in subsequent sampling, and in May 1984, the Central Valley Regional Water Quality Control Board (RWQCB) was advised that trichloroethene (TCE) and tetrachloroethene (PCE) concentrations in three monitoring wells exceeded the California Department of Health Services (DHS) action level of 5 micrograms per liter (Ig/L). Ultimately, a remedial investigation/feasibility study (RI/FS) was conducted to address the groundwater plume (see Section 2.2.1).

2.1.1 Soil Gas and Groundwater Sampling

In 1985, Radian Corporation was contracted to determine the following:

- Existence of any off-depot migration of contaminated groundwater;
- Location of contaminant sources on the depot; and
- Additional work required to assess the environmental impacts of groundwater contamination.

Radian identified six contaminant areas (Radian. 1986), which were later confirmed by Woodward Clyde Consultants (WCC, 1992a). These were Areas 1 through 6 (Figure 2-2). Additional SWMUs were Identified in a Resource Conservation and Recovery Act (RCRA) Assessment Report (U.S. EPA, 1990a). Thirty-two active or inactive underground storage tanks (USTs) were also identified during environmental investigations (Figure 2-3).

2.1.2 Industrial Waste Lagoons and IWPL Investigations

2.1.2.1 In October 1988 and January 1989, before removing and disposing of industrial waste, samples were collected from each of the two lined industrial wastewater lagoons (SWMU 3) (Canonie, 1989). Numerous metals, including barium, chromium, copper, lead, and zinc, were detected above Soluble Threshold Limit Concentrations (STLCs) in the sludge samples. Of those analyzed, the only organics detected were chlordane from the sludge and diazinon in the sludge and the liquid.

2.1.2.2 In 1991, Advanced Engineering and Planning Corp., Inc. (AEPCO) conducted an industrial process system assessment to identify waste treatment and disposal operations, processes, and techniques at the depot to minimize waste generation and/or eliminate compliance problems. During the associated investigations, soil and water samples were collected from the current wastewater management system, the industrial waste pipeline (IWPL), and the lined waste lagoons (SWMU 3). Concentrations of heavy metals, pesticides, and solvents exceeded regulatory levels (AEPCO, 1991).

2.2 CERCLA Activities

In 1991, DDJC-Tracy was listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) as a Superfund site. On 27 June 1991, DDJC-Tracy, the U.S. EPA Region IX, and the California Department of Toxic Substances Control (DTSC) signed a Federal Facilities Agreement (FFA) for DDJC-Tracy. This FFA has enforceable schedules and ensures that environmental impacts from past and present operations are thoroughly investigated and that appropriate cleanup actions are taken to protect human health, welfare, and the environment. The U.S. EPA, DTSC, and the RWQCB provide regulatory oversight consisting of technical support, review, and comment on all investigative work and cleanup work at DDJC-Tracy. The following sites were identified as potential threats to human health and the environment:

- 36 SWMUs;
- 10 drum storage areas with soil contamination;
- 28 UST sites;
- Contaminated groundwater associated with Operable Unit (OU) 1;
- The Day Care Center; and
- Other areas with surface and near-surface soil contamination.

Past practices at these sites are shown in Table 2-1. The CERCLA process is summarized in Figure 2-4.

2.2.1 Operable Unit 1 Remedial Investigation/Feasibility Study

2.2.1.1 The contaminated groundwater within the upper Tulare Formation was considered the most pressing concern and was identified as OU 1. The first phase of the DDJC-Tracy CERCLA program focused on OU 1.

2.2.1.2 Between 1986 and 1992, WCC was under contract to conduct an RI/FS at DDJC-Tracy as required by CERCLA (and subsequent Superfund Amendments and Reauthorization Act [SARA] guidelines). In 1992, as a result of the WCC investigation, the OU 1 plume was identified as an area of contaminated groundwater emanating from DDJC-Tracy. The OU 1 plume affected groundwater both on and off depot. Chemicals of concern (COCs) included VOCs, pesticides, and potentially metals; TCE and PCE were detected most extensively in the groundwater.

2.2.1.3 The maximum TCE concentration in the groundwater was 560 Ig/L, and the maximum PCE concentration was 410 Ig/L. The TCE and PCE plumes are moving north-northeast at approximately 80 and 40 ft/year, respectively. During the OU 1 Remedial Investigation/Risk Assessment (RI/RA), WCC concluded that past solvent storage, handling, and use practices at DDJC-Tracy led to TCE and PCE contamination; however, specific source areas were not identified.

2.2.1.4 The baseline human health risk assessment (WCC, 1992b) found that the OU 1 plume posed insignificant risks to depot personnel, off-depot agricultural workers, and consumers of agricultural crops. The risk assessment also found that residents downgradient of the depot may have been at risk because they used well water and were close to the OU 1 groundwater plume. Unless remedial action was taken, the risk for nearby residents was expected to increase with time as contaminants in groundwater continued to migrate off site. The ecological risk assessment concluded that the primary potential exposure pathway for plants and animals from the OU 1 groundwater plume would be through flood irrigation water supplied by the agricultural wells located on the private property immediately north of the depot.

2.2.1.5 The OU 1 Feasibility Study (FS)(WCC, 1992c) included background information used to develop and screen remedial technologies for OU 1 groundwater contamination. Remediation goals were health-risk based. Water quality requirements were also considered, especially for defining discharge requirements. Several technologies for groundwater treatment were evaluated based on effectiveness, implementability, and relative cost.

2.2.2 OU 1 Record of Decision

2.2.2.1 In August 1993, the final OU 1 Record of Decision (ROD) (WCC, 1993) was signed. The ROD stated that the OU 1 remedial action would address "the principal threat posed by the (groundwater contaminant) plume by prioritizing action at OU 1 over any additional cleanup associated with other potential sources of contamination at the depot" (WCC, 1993). The impact to a residential drinking water well and the potential impact to a second residential well by TCE and PCE were the principal threats posed by the groundwater contamination. To eliminate these threats and to protect human health and the environment, the ROD prioritized the remediation of TCE, PCE, and 1.1-dichloroethene (1,1-DCE) in the groundwater. Extraction wells were to be strategically placed to:

- Remediate "hot spots" (the portions of the plume with the highest concentrations);
- Minimize contaminant transport off depot; and
- Minimize plume migration and clean up the plume to the federal Maximum Contaminant Levels (MCLs) for TCE and PCE and the California MCL for 1,1-DCE (WCC, 1993).

2.2.2.2 As the OU 1 ROD describes, the selected alternative was to extract, treat, and reinject the contaminated groundwater. In addition, the OU 1 ROD set aquifer cleanup levels of 5 Ig/L for TCE and PCE and 6 Ig/L for 1,1-DCE. The OU 1 ROD also specified effluent treatment standards for carbon tetrachloride, chloroform, 1,1-DCE, dieldrin, PCE, TCE, and total VOCs (halogenated hydrocarbons).

2.2.2.3 In addition to the effluent treatment standards specified in the OU 1 ROD, the RWQCB specifies effluent treatment standards in a Waste Discharge Requirements (WDR) permit based on the State Water Resources Control Board (SWRCB) Resolution 92-49 ("Policies and Procedures for Investigation and Cleanup and Abatement of Discharge"). The effluent treatment standards for several VOCs and pesticides not included in the OU 1 ROD were adopted into the OU 1 ROD through an Explanation of Significant Difference (ESD)(Montgomery Watson, 1995). An ESD is required as documentation when significant changes are made to the final ROD. The WDR permit prescribes effluent standards for the following compounds: carbon tetrachloride, chloroform, total chromium, 1,1-DCE, PCE, TCE, dieldrin, DDD, DDE, DDT, chlordane, monuron, diuron, and total VOCs.

2.2.2.4 The OU 1 ESD also modified the technology for removing VOCs from the aquifer to include dispersion (encompassing metabolism and volatilization). This modification resulted from a comparative analysis of the most cost-effective approaches for achieving ROD-stipulated objectives while minimizing capture of an off-site chloroform and carbon tetrachloride plume and eliminating off-site extraction facilities. This particular off-site chloroform and carbon tetrachloride plume appears to be emanating from an off-site source (other than DDJC-Tracy); however, this ROD does address additional chloroform contamination attributed to the depot.

2.2.3 OU 1 Well Monitoring Program

The Well Monitoring Program (WMP), which has been conducted at DDJC-Tracy since May 1991, provides complete and current groundwater data from wells throughout the depot and vicinity. These data allow seasonal variations of groundwater levels to be evaluated; the data also allow the nature and extent of groundwater quality variations to be determined.

2.2.4 OU 1 Well Abandonment Program

Drinking water wells 1 (in Area 1) and 2 (near SWMU 2) were previously abandoned to eliminate exposure to contaminated groundwater and to control contaminant migration. The OU 1 RI/FS also identified three agricultural supply wells (AG-1, AG-2, and AG-3) that may have served as conduits and created a vertical hydraulic gradient for contaminants to migrate downward. Eleven wells had a history of turbid samples, were suspected of being damaged or improperly installed, or had been dry for several years. The OU 1 RI/FS recommended that these wells be abandoned. The Final Well Abandonment Work Plan provides general procedures for well abandonment (Montgomery Watson, 1994a). Abandonment of the above wells was completed from October 1994 to June 1995. The abandonment of the wells is documented in the DDRW-Tracy Final Well Abandonment Engineering Report (Montgomery Watson, 1996f).

2.2.5 OU 1 Remedial Action

2.2.5.1 Starting in 1990, ENSOTECH, Inc. installed the OU 1 interim remedial measure (IRM) system. The IRM system controls the migration of the contamination, reduces levels of VOCs, and provides data to evaluate the effectiveness and potential use of the selected remedial technology for the full-scale design. The system includes six extraction wells, an air stripper, three injection wells, two piezometers, and 10 monitoring wells (ENSOTECH, 1991). Later, DDJC-Tracy expanded the IRM to increase the influent flow from the contaminated portion of the TCE and PCE plumes from 125 gallons per minute (gpm) to greater than 350 gpm, and constructed two infiltration galleries (injection wells performed poorly) for discharging treated water. The modified IRM system will be integrated with the final full-scale groundwater remediation system for OU 1.

2.2.5.2 The design of the full-scale OU 1 pump-and-treat system was completed in April 1996. The full-scale OU 1 groundwater remediation system is presently being constructed.

2.2.5.3 The full-scale system design includes liquid-phase granular activated carbon (GAC) wellhead treatment for removing pesticides at existing extraction wells EW-2 and EW-5 to comply with waste discharge requirements (Montgomery Watson, 1996c).

2.2.6 Comprehensive Remedial Investigation/Feasibility Study

2.2.6.1 The comprehensive Remedial Investigation/Feasibility Study (RI/FS) report reevaluated and reaffirmed the OU 1 ROD and ESD and addresses all areas that were not addressed as part of the OU 1 RI/FS. Montgomery Watson performed the Comprehensive Site-Wide RI/FS (Final RI/FS) as part of the Department of Defense's Installation Restoration Program (IRP). The purpose of the Comprehensive RI/FS was to investigate potential sources of environmental contamination at DDJC-Tracy and to collect data to support the following activities:

- The evaluation and selection of remedial alternatives;
- The baseline human health risk assessment:
- The ecological assessment; and
- The design of the selected remedy.

2.2.6.2 The Comprehensive RI/FS at DDJC-Tracy was conducted from 1993 through 1995 (Montgomery Watson, 1995a). The following sites were investigated:

- OU 1;
- 66 sites;
  - 28 SWMUs,
  - 10 Soil Contamination Areas, and
  - 28 UST sites;
- The Day Care Center; and
- Surface and near-surface soils (Montgomery Watson, 1996a).

2.2.6.3 The history of waste disposal practices at the SWMUs and other contaminated sites is summarized in Table 2-1. Table 2-2 summarizes the status of all sites investigated in the RI/FS. Table 2-3 summarizes the status of the UST sites.

2.2.6.4 The following eight SWMUs were not investigated in the comprehensive RI/FS because they were recommended and approved for no further remedial investigation in the Final Comprehensive RI/FS Work Plan (WCC, 1992a; Montgomery Watson, 1993):

- SWMU 2A, Sewage Treatment Plant;
- SWMU 13, Construction Material Landfill;
- SWMU 17, Active Wells;

- SWMU 18, Inactive Wells, properly abandoned;
- SWMU 19, Aboveground Waste Tank;
- SWMU 26, Storage Area for Contaminated Waste;
- SWMU 28, Phostoxin Waste Storage Area; and
- SWMU 32, Pesticide Sinks.

2.2.6.5 Past practices and preliminary screening indicated that these sites were not sources of contamination (see Table 2-2).

2.2.7 Selection of Sites for Feasibility Study

After the RI was completed, sites were selected to proceed to the FS if concentrations detected at the site indicated the presence of COCs. A COC was identified on the basis of one of the following criteria:

- Actual or potential threats to beneficial uses of groundwater or background water quality;
- Increased lifetime cancer risks (ILCR) greater than 1 x 10 -6 to installation employees, construction workers, or children on the installation;
- Noncancer health risks (or hazard indices) greater than 1.0 to employees, construction workers, or children on the installation; or
- Potential risks to ecological receptors.

2.2.8 Sites Studied for Feasibility of Remedial Action

The sites recommended for the FS are divided into three groups: A, B, and C. The rationale for the grouping was:

- Group A: VOCs in the soil and soil gas at these sites pose threats to groundwater;
- Group B: Multiple COCs at these sites pose threats to groundwater or risks to human or ecological receptors;
- Group C: These sites received or conveyed industrial wastewater and have been evaluated for a non-time-critical removal action through an engineering evaluation/cost analysis (EE/CA).

2.2.9 Sites Recommended for No Further Action

2.2.9.1 Fifteen sites were recommended to proceed to the FS based on a site-specific data evaluation and a baseline risk assessment. If the evaluation of the nature and extent, fate and transport, and risk assessment indicated that a COC at a site exceeded certain criteria, the site was evaluated in the FS. Sites without COCs meeting these criteria were recommended for no further action (Table 2-2). Each of the following criteria were used to identify the no further

- No COCs pose actual or potential threats to groundwater beneficial uses or exceed background concentrations;
- No COCs pose an excess cancer risk greater than 1 x 10 -6 to depot workers, construction workers, or children on the installation;
- No COCs have a noncancer hazard index greater than 1.0 for depot workers, construction workers, or children on the installation; and
- There is no ecological risk.

2.2.9.2 The sites where no water quality site assessment was performed are discussed in Section 6.7. SWMU 10A was identified as a No Further Action site, although vadose zone modeling indicated a potential threat to groundwater quality (see Table 7-15).

2.2.10 Day Care Center

2.2.10.1 The day care center (DCC), located in the northwest portion of DDJC-Tracy, adjacent to the main entrance on Chrisman Road, consists of the DCC building and a fenced play yard approximately 200 feet by 300 feet. The temporary children's play area (TCPA), an outside play area, is located north of Building 100, approximately a quarter mile north of the DCC.

2.2.10.2 After site investigations by Montgomery Watson from 1992 to 1995 and Radian in 1996, it was determined that contaminant levels detected in the soil at the DCC posed a minimal health risk. Specifically, they posed a potential cancer risk of 2x10-5 (primarily from dieldrin) and a hazard index of 0.3 for children attending the DCC. The compounds detected at the DCC included polycyclic aromatic hydrocarbon (PAH) compounds (at less than 10 parts per billion [ppb]) and pesticides (above background threshold levels). At one location, lead was detected at a concentration of 20.3 parts per million (ppm), which is above the background threshold level of 14.8 ppm. Because the pesticides at these levels had the long-term potential to impact children, DDJC-Tracy executed a time-critical removal action and replaced the soil and playground pea gravel at the DCC with new clean fill, sod, and pea gravel. The public was notified concerning the removal and an action memorandum was prepared that documents the removal decision. No action was performed at the TCPA because the pesticide levels detected there were all below the background threshold levels (Radian, 1996b).

2.2.11 Proposed Plan

A Final Proposed Plan was prepared to provide information to the public about planned actions at the sites listed above and to seek public input prior to making final decisions. The proposed plan for DDJC-Tracy presents remedial alternatives and the preferred alternative for each site with rationale for the selection (Montgomery Watson, 1997a). The Remedial Design/Remedial Action schedule to implement the selected alternatives must be submitted within 21 days after this ROD is signed.

2.3 Non-CERCLA Investigations

Thirty-one of the 32 UST sites were included in the comprehensive RI. All of these 31 UST sites are inactive. The only UST site that was not investigated in the RI was UST 16, which was active. Twenty-eight sites were transferred out of the RI to the Tri-Regional Guideline program managed by the RWQCB. Three UST sites (8, 21, and 31) were maintained within the RI as SWMUs 64, 6, and 24, respectively, because nonfuel hydrocarbon compounds were identified in the soil or groundwater near the three USTs. These sites are all adjacent to SWMUs. The remainder of the USTs are not subject to CERCLA. Fifteen sites have been closed. Nine other sites will be further characterized. The other four will be remediated. Table 2-3 shows the current status of the UST sites. Figure 2-3 shows the locations of the UST sites.

Table 2-1. Background of Solid Waste Management Units and Soil Areas

SWMU 1/Area 2	Old Sewage Lagoon and Former Drum Storage Area-This area was used as a drum storage area from 1957 through 1984. Chemicals in drums possibly leaked or were discharged accidentally.
SWMUs 2/3	Sewage (SWMU 2) and Former Industrial Waste Lagoons (SWMU 3)-The wastewater treatment plant has a permitted discharge to the sewage lagoons. SWMU 3 formerly received discharge from the industrial waste pipeline (SWMU 33). The lagoons have been in operation since 1942. Sometime between 1971 and 1979, industrial wastes from SWMU 3 overflowed into SWMU 2.
SWMU 4	Storm Pond Lagoon-Storm water has been discharged to the lagoon since 1971. The storm drain lagoon reportedly received rinse water from paint-stripping, degreasing, and steam cleaning operations. The area was used for open storage before 1952. Manganese ore was stockpiled northeast of the lagoon area from 1957 to 1968.
SWMU 5	Old Industrial Lagoon, Building 255-The site was constructed by 1952. The lagoon received rinse water from the paint-spraying and paint-stripping operations in Building 255. The lagoon was enlarged in 1963 and existed until at least 1971.
SWMU 6	Building 28 Sump-The sump operated from 1968 to 1977. A portion of Building 28 was used for repackaging. Wastes from the repackaging operations collected in the sump. The sump was initially abandoned in place and then removed in 1988. Former UST Site 21 was also in this area.
SWMU 7	Burn Pit No. 1-Site of seven former burn pits (Pits A-G) that were used between 1942 and 1954 to dispose of medical supplies, narcotics, pharmaceuticals, radiological supplies, and electron tubes. The pits are partially or completely covered by Buildings 15, 19, and 21.
SWMU 8	Burn Pit No. 2-A single large burn pit was operated between 1942 and 1971. Various containers, crates, wooden pallets, trash, unknown liquids and solids, and narcotics were burned in the pit. Explosions attributed to intermixing liquid chemicals or burning pressurized containers were reported.
SWMU 9	Subsistence Waste Pit-Subsistence waste, primarily food, was buried in the pit beginning in 1947. Packaging materials were also buried.
SWMU 10	Medical Waste Burial Pit-Former medical waste and burial pit. Outdated medical supplies, narcotics, mercury compounds, and phosphate compounds were buried. The pit operated from approximately 1949 until 1965. Since 1967, this area has been used for the storage of truck trailers.
SWMU 10A	Possible Medical Waste Burial Pit-A former pit was reportedly used to bury medical wastes. Possible trenches are visible in aerial photographs from 1945 to 1967.

Table 2-1. (Continued)

SWMU 11	Burial of Lime/Foot Bath-Site was reportedly used to dispose of lime materials associated with lime foot baths. Area is currently covered with asphalt.
SWMU 12	Embalming Fluid Dump-An unknown, but substantial quantity of embalming fluid containing formaldehyde was buried just east of Building 30.
SWMU 14	Lube Oil Dump-Reported site of a former lube oil dump. Reportedly 150 drums of new lube oil were emptied into a trench in 1976. The trench was backfilled in 1976. Oil seepage was visible in aerial photographs. A black viscous surface was reported by construction workers in 1992.
SWMU 15	Pesticide Waste Trench-Former pesticide waste trench from 1977 or 1978 until 1979. Rodenticide, crushed cans that formerly contained pesticides, phosgene (or phostoxin) slurry, and empty DDT containers may have been buried. Between 1979 and 1980, the trench was excavated and the contents were disposed off site.
SWMU 16	Possible Waste Disposal Area-Possible waste disposal area from 1952 till 1967. Possible wastes include asbestos, mercury, fluorescent bulbs, and medical supplies.
SWMU 20/23	Aboveground Solvent Tank and Building 26 Recoup Operations-A 500-gallon aboveground TCE degreasing unit was located inside Building 10. Building 10 was constructed in 1950. According to warehouse plans, several cleaning facilities were used between 1950 and 1974. A spray paint booth and cleaning operations were reportedly connected to the Manhole W-1 of the industrial wastewater pipeline (SWMU 33). A 2,000 gallon tank of No. 2 fuel oil was previously located at former UST Site 13. Building 26 was used to repackage petroleum products. A wash rack was also present at this site.
SWMU 21	Battery Acid Dump-Neutralized solution from the battery shop was discharged to the ground and a sump behind Building 201.
SWMU 22	Previous Hazardous Materials Storage Area-Former storage area from 1979 until 1985. Leaking containers of hazardous materials (i.e., ammonium thiosulfate) were stored here prior to repackaging or off-site disposal. The holding area was lined with bentonite clay.
SWMU 24	Petroleum Waste Oil Tank-A 500-gallon tank stored petroleum wastes from the materials testing in Building 247. The tank was used from 1961 until it was removed in 1988.
SWMU 25	Boundary Roads-Waste motor oil may have been used as a dust suppressant in the 1940s and 1050s. Most of the roads are presently paved.
SWMU 27	Building 206 Roundhouse Sump, Building 206-Fluids used to clean locomotives were reportedly drained into the sump. Pesticides were reportedly stored in Building 206. A service pit in Building 206 may have been used to transfer fuel oil from UST Site 7 to the boiler room.

Table 2-1. (Continued)

SWMU 29	Used Motor Oil Pit-Former motor disposal pit. Period of operation is uncertain.
SWMU 30	Salvage Area-Former salvage area. No information regarding the types or volumes of wastes is available.
SWMU 31	Wood Preservation Area-Site was used for wood preservation operations from the mid-1950s until 1960. Wood products were dipped into vats of phenolic compounds and carbolic acid to prevent the wood from rotting. The vats were covered with canvas tarps. Spills from the vats were reported.
SWMU 33	Industrial Waste Pipeline (IWPL)-The IWPL was constructed in 1972. Discharges to the IWPL included paint spray wastewater, phosphoric acid and sodium hydroxide from strippers and rinse tanks, pesticide wastewaters, cleaning tank washwaters, steam cleaner washwater, and acid washwater.
SWMU 64	Waste Oil Pit-A 1,000-gallon metal tank that contained waste oils from the automotive maintenance shop was located at this location. The tank was installed in 1975 and removed in 1988.
Area 1 Building 236	Solvent Storage Area.
Area 1 Building 237	Former Solvent Storage Area-Now used for cleaning asphalt application tools and equipment.
Area 3	Drum Storage Area-Former drum storage area. Some drums may have leaked or spills may have occurred.
Building 15	Drum Storage Area-Petroleum hydrocarbons and metals wastes were previously stored at this site. The site includes a concrete slab where materials are stored.
Building 22	Drum Storage Area-Site includes a paved area where materials are stored. Drums of solvents may have been stored here in the past.
Building 23	Area is adjacent to several open storage areas. Previously called Containment Area 5.
Building 30	Drum Storage Area-Petroleum hydrocarbons and metals wastes were previously stored at this site. Solvents may have been stored here. The site is partially covered by the Consolidated Subsistence Facility (constructed in 1992).

Table 2-1. (Continued)

Surface and Near Surface Soils	This nonvegetated area of bare soil in the northern depot was used as a storage area for the National Stockpile of Strategic Metals. From 1980 to 1986, lead ballast was stored here. From shortly after World War II until the 1980s, ferrous chromium was stored in Quadrants VII and VIII. Manganese ore was also stored here from shortly after World War II until the 1970s.
Day Care Center	A 1,200-gallon UST containing No. 2 fuel oil was previously located at this site from 1956 until 1988. Pesticide contamination was also found in soil samples.

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Table 2-3. Status of the UST Sites, DDJC-Tracy, Comprehensive RI/FS and UST Site Investigations

			Findings					Recommendations			
Site	Number of Tanks	Removal	Number of RI/FS Phase 1 Borings	Soil Contaminants	Groundwater Contaminants	Tank Location NotFound	Regulated Under Tri Regional Guidelines/ CERCLA	Additional Characterization a	Removal Action/Remediation b	No Further Action c	Current Status
UST 1	1	1988	3	ND	ND		Tri-Regional Guidelines			x	Site Closed g
UST 2	1	1988	3	ND	ND		Tri-Regional Guidelines			x	Site Closed g
UST 3	1	c	3	ND	ND		Tri-Regional Guidelines			x	Site Closed g
UST 4	1	1973	3	ND	ND		Tri-Regional Guidelines			x	Site Closed g
UST 5	1	1988	3	ND	ND		Tri-Regional Guidelines			x	Site Closed g
UST 6	2	1988	6	TPH-G, BTEX, EDB	TPH-G, BTEX, TPH-MO		Tri-Regional Guidelines	x	x		Additional Investigation Planned
UST 7	2	1988	6	TPH-D, TPH-MO	TPH-D BTEX		Tri-Regional Guidelines				Characterization Complete h
UST 8	1	1988	NA	NA	NA		CERCLA				Identified and Investigated as SWMU 64
UST 9	1	1988	3	ND	TPH-D	x	Tri-Regional Guidelines				Characterization Complete h
UST 10	1	1989	6	TPH-D, BTEX	TPH-D,BTEX		Tri-Regional Guidelines				Characterization Complete h
UST 11	1	1988	3	ND	ND		Tri-Regional Guidelines			x	Site Closed g
UST 12	1	1988	2	ND	ND		Tri-Regional Guidelines			x	Site Closed g

Table 2-3. (Continued)

					Findings				Recommendations		
Site	Number of Tanks	Removal	Number of RI/FS Phase 1 Borings	Soil Contaminants	Groundwater Contaminants	Tank Location NotFound	Regulated Under Tri Regional Guidelines/ CERCLA	Additional Characterization a	Removal Action/Remediation b	No Further Action c	Current Status
UST 13	1	1988	3	TCE, Pest	TCA, TCE, Pest		Tri-Regional Guidelines	X d			Continued Investigation as SWMU 20
UST 14	1	1988	3	TPH-G, BTEX	ND		Tri-Regional Guidelines	X	X	X	Additional Investigation
UST 15	1	1988	2	ND	ND		Tri-Regional Guidelines			X	Site Closed g
UST 16	1	NA	NA	NA	NA		Tri-Regional Guidelines				Active and permitted UST
UST 17	1	1988	3	1 TPH-D	ND		Tri-Regional Guidelines			X	Site Closed g
UST 18	1	1988	3	TPH-D TPH-MO, BTEX	ND		Tri-Regional Guidelines	X	X		Additional Investigation
UST 19	1	1988	3	TPH-D, BTEX	ND		Tri-Regional Guidelines	X	X		Additional Investigation
UST 20	1	1988	3	TPH-D	TPH-D	X	Tri-Regional Guidelines				Characterization Complete 1
UST 21	1	1988	NA	NA	NA		CERCLA				Identified and investigated as SWMU 6
UST 22	1	1988	2	Toluene	ND		Tri-Regional Guidelines			X	Site Closed g
UST 23	2	1988	6	Toluene, Xylene	ND		Tri-Regional Guidelines			X	Site Closed g

Table 2-3. (Continued)

Site	Number of Tanks	Removal	Number of RI/FS Phase 1 Borings	Soil Contaminants (Findings)	Groundwater Contaminants (Findings)	Tank Location NotFound (Findings)	Regulated Under Tri Regional Guidelines/ CERCLA	Additional Characterization (Recommendations)	Removal Action/Remediation b (Recommendations)	No Further Action c (Recommendations)	Current Status
UST 24	1	1988	3	TPH-D	TPH-D		Tri-Regional Guidelines	X	X		Additional Investigation
UST 25	1	1988	3	TPH,BTEX	TPH-D, Benzene		Tri-Regional Guidelines	X	X		Additional Investigation
UST 26	1	1988	3	ND	ND		Tri-Regional Guidelines			X	Site closed g
UST 27	1	1988	3	TPH-D,Xylene, TPH-MO	Xylene		Tri-Regional Guidelines	X	X		Additional Investigation
UST 28	1	1988	3	ND	ND		Tri-Regional Guidelines			X	Site Closed g
UST 29	1	1988	3	ND	ND		Tri-Regional Guidelines			X	Site Closed g
UST 30	1	1988	3	ND	ND		Tri-Regional Guidelines			X	Site Closed g
UST 31	1	1988	NA	NA	NA		CERCLA				Identified and investigated as SWMU 24
UST 32	1	1988	4	TPH-D, Ethylbenzene	Toluene		Tri-Regional Guidelines	X			Additional Investigation

Table 2-3. (Continued)

a Continue with characterization under the Tri-Regional Guidelines program.
b Removal action performed by Sacramento District USACE under Pre-placed Remedial Action Contracts (PRAC). Sites requiring no further action under Tri-Regional Guidelines will be coordinated with RWQCB for closure.
c No further action necessary under the Tri Regional Guidelines program.
d UST 13 Closure Report submitted due to no evidence of fuel-related contamination. However, non-fuel-related constituents will continue to be investigated as SWMU 20, located adjacent to the former UST 13 site. Additional sampling will be conducted along the 1WPL to confirm that nearby diesel hits along the pipeline are not related to this UST.
e UST 3 was abandoned in place in 1972.
f Additional investigations were performed in 1995 and 1996. A detailed description of the results is provided in the final UST Site Investigation Field Work Report (Radian. 1996c); potential remedial alternatives are currently being assessed.
g Approved for closures by RWQCB (Letter from Karen Bessette dated 15 Aug 1996)
h Natural attenuation is recommended at this site.
i Bioventing combined with natural attenuation is recommended at this site.

BTEX = benzene, toluene, ethylbenzene, and xylenes
CERCLA = Comprehensive Environmental Response, Compensation and Liability Act
EDB = ethylene dibromide:
IWPL = Industrial Wastewater Pipeline
NA = not applicable
ND = not detected
Pest = pesticides
RWQCB = Regional Water Quality Control Board
SWMU = Solid Waste Management Unit
TCA = trichloroethane
TCE = trichlortoethene
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
TPH-MO = total petroleum hydrocarbons as motor oil
USACE = U.S. Army Corps of Engineers

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3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

3.1 A Proposed Plan summarizing the alternatives considered in the DDJC-Tracy Comprehensive Remedial Investigation/Feasibility Study (RI/FS) was released in November 1996 and was made available to the public in the Administrative Record located at DDJC-Tracy's Environmental Protection Division, Building S-108 Sharpe Facility, Lathrop, California, and in the Information Repository maintained at the same address. The Proposed Plan was also mailed to the installation's 1,200-address mailing list on 31 January 1997. The 30-day public comment period on the Proposed Plan ran from 5 February to 6 March 1997. A Public Notice appeared on 4, 14, and 18 February 1997 in the Tracy Press, and on 4, 16, and 18 February in the Stockton Record to announce the Proposed Plan's public comment period and to invite the community to attend a public meeting held on 19 February 1997, at the City of Tracy Community Center, Tracy, California. Comment responses are provided in the Responsiveness Summary.

3.2 The 19 February public meeting was held to answer the community's questions about the Proposed Plan and to solicit public input on the selected remedial alternatives presented in the Proposed Plan. Meeting attendees are listed in Table 3-1.

3.3 The document was made available to the public in the Administrative Record located at DDJC-Tracy's Environmental Protection Division, Building S-108 Sharpe Facility, Lathrop, California, and in the Information Repository maintained at the same address.

3.4 The DDJC-Tracy ROD and the related Proposed Plan are based on the site's Administrative Record and were developed in accordance with applicable federal and state laws, regulations and codes, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan (NCP).

Table 3-1. DDJC-Tracy Public Meeting [a] Attendees

Name	Affiliation
Art Dohrman	U.S. Army Corps of Engineers (CEHNC-ED-CS-G)
Bruce Whisenant	U.S. Army Corps of Engineers (CEHNC-ED-CS-P)
John Crow	U.S. Army Corps of Engineers (CEHNC-ED-ME-H)
Mike Eisenzimmer	U.S. Army Corps of Engineers (CEHNC-ED-ME-E)
Steve Glover	U.S. Army Corps of Engineers (CEHNC-ED-CS-P)
Steve Light	U.S. Army Corps of Engineers (CEHNC-PM-ED)
Capt. Casey	DDJC
Col. Melton	DDJC
Doug Imberi	DDJC
Fred Green	DDJC
John S. Green	DDJC
Roxanne Yonn	DDJC
John Guzman	DDJC Environmental Office (ASCW-BE)
Peter Kalush	DDJC Environmental Office (ASCW-BE)
Victoria Shankel	DDJC Environmental Office (ASCW-BE)
Wes Harris	DDJC Environmental Office (ASCW-BE)
Bruce McCarty	DDJC Office of Counsel
Jim Pinasco	CAL EPA (DTSC)
Karen Bessette	CAL EPA (RWQCB)
Michael Work	US EPA, Region IX
Deborah Hirsch	Radian International
Jeff Herrin	Radian International
Graham Sharpe	Radian International
Rob Owens	CAL EPA (DTSC)
Rose Newman	Lawrence Livermore National Laboratory
John Lamb	Remedial Resources/Prime Environmental
Bert Heffner	Citizen
Donald Springer	Citizen
Glenn Robertson	Citizen
Jeff Stewart	Citizen
Marjorie Hannon	Citizen
Phil Martin	Citizen
Robert Raspo	Citizen
Stephen Reid	Citizen

[a] Meeting held on 19 February 1997

4.0 SCOPE AND ROLE OF THE RESPONSE ACTION

4.1 As with many Superfund sites, the environmental issues at Defense Depot San Joaquin (DDJC)-Tracy are complex. As a result, DDJC-Tracy organized the environmental response program into two phases. Operable Unit (OU) 1 was defined in the first phase as the contaminated groundwater within the Upper Tulare Formation, both on- and off-depot, that is emanating from DDJC-Tracy. The OU 1 contamination was addressed first because the concerns associated with OU 1 were considered the most urgent. Remedies have already been selected for OU 1 (see Section 2) , and the Record of Decision (ROD) (WCC, 1993) for this operable unit was signed in August 1993. A pump-and-treat system has been installed to treat groundwater. The expanded OU 1 treatment system will begin operation in the first quarter of 1998.

4.2 This ROD is the second phase of the DDJC-Tracy environmental response program and addresses all of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) issues. This ROD will serve as the Final Remedial Action Plan for DDJC-Tracy.

4.3 All contaminated media at the depot are addressed in this ROD. The objectives of this comprehensive ROD are as follows:

- Reaffirm or modify as appropriate the selected remedy from the OU 1 ROD. The OU 1 ROD specifically indicated that all groundwater chemicals of concern and pathways would be reevaluated in the Comprehensive RI/FS (OU 1 ROD, Section 4.2.2) and that the feasibility of a more stringent aquifer cleanup standard would be evaluated (OU 1 ROD, Section 4.2.4).

- Address the sites of soil/vadose zone contamination identified in the comprehensive remedial investigation program (see Table 2-1).

- Document the selected remedial actions and document that they are protective of human health and the environment.

4.4 The sites addressed in this ROD are identified in Table 2-1. Each of the Solid Waste Management Units (SWMUs) and soil areas was investigated for potential surface and near-surface soil contamination. Impacts to groundwater from these sites were identified and evaluated through monitoring and modeling. A risk assessment was also performed to identify threats to human health and ecological receptors. This ROD identifies the sites selected for no further action (NFA) and selects remedies for the remainder of the sites. By addressing all contaminated media, this ROD completes the identification of appropriate remedies for DDJC-Tracy.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Background

5.1.1 Several phases of Remedial Investigation/Feasibility Study (RI/FS) have been conducted at DDJC-Tracy. The results of these RI/FSS have been reported in the following:

- Operable Unit 1 Field Sampling Report DDRW-Tracy, California (Woodward-Clyde Consultants, 1992)

- DDRW-Tracy, California, Final Comprehensive Site Wide RI/FS: Phase I Site Characterization Report (Montgomery Watson, 1994b).

- DDRW-Tracy Draft Comprehensive RI/FS. Phase II Technical Memorandum (Montgomery Watson, 1995a).

- DDRW-Tracy, California: Final Comprehensive Remedial Investigation/Feasibility Study, Vols. I and II (Montgomery Watson, 1996a).

5.1.2 The goals of the Comprehensive RI/FS were to identify and investigate potential sources of contamination at DDJC-Tracy and to collect data to support the evaluation and selection of remedial alternatives, the baseline risk assessment (BRA), the ecological risk assessment (ERA), and the design of the selected remedies (Montgomery Watson, 1996a). The RI/FSs were comprehensive in that these goals were met. A summary of the human health risks may be found in

Sections 6.1 through 6.5, and a summary of the ecological risks may be found in Section 6.6.

5.1.3 The remainder of this section presents summaries of the sites investigated at DDJC-Tracy. Section 5.2 presents a site characterization summary of the contaminants in the Operable Unit (OU) 1 groundwater at DDJC-Tracy. Section 5.3 introduces the site characterization summaries of the contaminants in the soil at DDJC-Tracy. Sections 5.4, 5.5, 5.6, and 5.7 present brief summaries of the Group A sites, the Group B sites, the Group C sites, and the No Further Action site, respectively Section 5.8 presents the Time Critical Removal Action Site.

5.1.4 Soil, groundwater, sediment, and surface water are present at DDJC-Tracy. Soils at the depot consist of shale-pebble conglomerates of the Tulare Formation and the overlying Quaternary alluvium. The Tulare Formation, which composes most of the geologic column at DDJC-Tracy, has been divided into the Above Upper, the Upper, the Middle, and the Lower Horizons.

5.1.5 The Above Upper Horizon is the uppermost 25 to 35 feet of clays, silts, silty sand, and clayey sand. This interval is saturated only from the northern portion of the depot to the central portion of the annex. The Upper Horizon is a coarse-grained interval (predominantly sand and gravel, with lenses of silt, silty sand and clay) ranging between the depths of approximately 25 to 60 feet below ground surface (bgs). The Middle Horizon is another coarse-grained interval (silty sand, sand, and gravel) separated from the Upper Horizon by the Upper/Middle Aquitard. The Middle Horizon occurs in the depth interval between approximately 55 to 85 feet bgs. The top of the Lower Horizon occurs at a depth of approximately 110 feet bgs and consists primarily of sand and gravel. Fine-gained materials are present at a depth of approximately 170 feet bgs. Surface water and sediment occur locally at DDJC-Tracy only as part of the storm drain lagoon (SWMU 4) and the sewage and former industrial waste lagoons (SWMUs 2/3).

5.1.6 Each of the media present at DDJC-Tracy (soil, groundwater, sediment, and surface water) has been impacted by contaminants originating from past practices at the depot. The contaminants of concern (COCs) were identified using the following criteria:

- The concentration of the COC in the groundwater exceeds the criteria for beneficial uses of groundwater or background groundwater quality;

- The concentration of the COC in the surface water, sediment, or soil has the potential to exceed the criteria for beneficial uses of groundwater or background groundwater quality as indicated by the fate and transport (F&T) modeling conducted as part of a water quality site assessment (WQSA); or

- The COC exceeds the risk criteria for either human or ecological receptors.

5.2 Groundwater

5.2.1 The groundwater at DDJC-Tracy has been impacted by a variety of contaminants. The primary classes of groundwater COCs are volatile organic compounds (VOCs), pesticides, and herbicides. Contaminated groundwater is present in plumes, several of which are migrating off site to the north. Operable Unit 1 was designated in 1992 as a separate entity from the soil and shallower contaminants so that the OU 1 groundwater contamination could be addressed before soil problems. The final OU 1 Record of Decision (ROD) (WCC, 1993) was signed in August 1993.

5.2.2 Operable Unit 1 is defined as the contaminated groundwater plume, on and off depot, that is emanating from DDJC-Tracy. This plume is primarily characterized by tetrachloroethene (PCE) and trichloroethane (TCE). The distribution of these two contaminants is shown in Figures 5-1 and 5-2. The identified sources of VOCs to the groundwater are:

- SWMU 1/Area 2;

- SWMU 6;

- SWMU 8 (possible);

- SWMU 20 and Area 1 Building 10;

- SWMU 33;
- Area 1 Building 237; and
- Area 3.

5.2.3 The selected remedy for OU 1 is groundwater extraction and treatment. Groundwater is being extracted from the Upper, Middle, and Lower Horizons. Extracted groundwater is being treated by air stripping. The groundwater from two wells is also being treated using liquid-phase granular activated carbon (GAC to remove pesticides. Treated groundwater is being reinjected into the Upper Tulare Formation using infiltration galleries. A small portion of the plume is being allowed to attenuate naturally as described in the Memorandum of Significant Differences, dated 20 December 1995.

5.2.4 The OU 1 ROD established cleanup levels of maximum contaminant levels (MCLs) for TCE, PCE, and 1,1-DCE. Other VOCs detected in groundwater, including bromoform, carbon disulfide, cis-1,2-DCE, trans-1,2-DCE, methylene chloride, benzene, toluene, and xylenes, have been detected only sporadically and at low concentrations, so cleanup levels were not established for them.

5.2.5 Chloroform has also been detected sporadically in groundwater in a group of installation monitoring wells (LM003A, LM030AU, LM101A, and LM094AU) and two off-depot wells (LM055B and LM056C. The maximum detected concentration of chloroform is 16 Ig/L. The probable source of chloroform is the transformation of chlorine from the wastewater treatment plant or potable water leaked from water mains at the facility. The locations of the wells where chloroform was detected are too far to the west and across gradient to be attributed to off-site sources. However, these sporadic detections do not constitute a plume that requires additional cleanup limits in the OU 1 remedy. The concentrations of chloroform will continue to be monitored as part of the ongoing Groundwater Monitoring Program at DDJC-Tracy.

5.2.6 The occurrence of chloroform, bromodichloromethane, and dibromochloromethane concentrations in LM003AA and the "disappearance" of consistently detected TCE and PCE in the fourth quarter 1996 sample suggest that treated water was the "source" of contamination at that location. All of the chloroform occurrences have been downgradient from SWMU 2 and SWMU 3, which have received chlorinated effluent from the waste-water treatment plant for a number of years.

5.2.7 A separate discussion of a remedy for chloroform is not necessary in this document because:

- There is no defined chloroform plume associated with depot activities;
- Chloroform concentrations are less than 10% of the California Action Level for trihalomethanes in drinking water supplies; and
- All chloroform concentrations have been reported within the outer boundaries of Upper, Middle, or Lower Horizon TCE plumes.

5.2.8 Pesticides and herbicides have been detected in OU 1 groundwater. Detected contaminants include dieldrin, chlordane, DDD, DDE, DDT, monuron, and diuron. These contaminants have primarily been identified in the northwestern portion of the depot. The primary sources of these contaminants to the groundwater are the sewage and industrial waste lagoons, burn pit No. 2 (SWAU 8), and the industrial waste pipeline (SWMU 33). Figure 5-3 shows the distribution of dieldrin in groundwater. A dieldrin plume can be observed to emanate from the sewage and industrial waste lagoons (SWMUs 2 and 3). The other pesticides and herbicides do not display a geographic distribution that can be characterized as a plume.

5.3 Soil

5.3.1 The soil at many of the sites at DDJC-Tracy has been contaminated by past activities at the installation. The primary classes of contaminants in the soil include VOCs (also identified in soil gas), semivolatile organic compounds (SVOCs), and pesticides. Metals and SVOCs are minor contaminants in the soil. For the most part, COCs in the soil are those with the potential to exceed the criteria for beneficial uses of groundwater or background groundwater quality-primarily VOCs, and pesticides but also occasional SVOCs.

5.3.2 Sections 5.4 through 5.7 present brief site characterization summaries (SCSs) of the results of the RIs at each of the sites at DDJC-Tracy. These sections summarize the Final Comprehensive Remedial Investigation Feasibility Study Vols. I and II (Montgomery Watson, 1996a). The SCSs present information that was relevant to the decision about whether or not to include a site in the FS. The SCSs present the following data:

- A brief summary of the past activities at a site that may have caused contaminants to be released to the environment;
- A brief summary of RI/FS activities conducted at a site;
- A tabulation of those contaminants that were identified as COCs based on the criteria presented in Section 5.2. The tabulation includes a presentation of the criteria exceeded (e.g., risk to human health, threat to beneficial uses of groundwater);
- The identification of the criteria exceeded; and
- The calculated volume of contaminated soil and the mass of the contaminants in the soil at that site.

5.3.3 Soil volume and contaminant mass data were generated by averaging the concentrations of contaminants in each affected area and multiplying the average concentration by the soil volumes provided in the RI/FS. These calculations are presented in a table in each SCS in Section 5.4, 5.5, and 5.6.

5.3.4 Section 5.4 comprises the SCSs for the Group A sites, the sites where a potential threat to groundwater exists because of the presence of VOC contamination in the soil. Section 5.5 comprises the SCSs for the Group B sites and other sites with soil contamination. Section 5.6 comprises the SCSs for the Group C sites, the sites associated with past and present DDJC-Tracy industrial waste systems that were evaluated in an Engineering Evaluation/Cost Analysis. Section 5.7 comprises the SCSs for the sites recommended for No Further Action.

<IMG SCR 98030LD>

5.4 Group A

5.4.1 SWMU 1/Area 2-Old Sewage Lagoon/Drum Storage Area (Group A)

5.4.1.1 Volatile organic compounds and PCBs have contaminated soil as the result of past site activities. SWMU 1 and Area 2 were a source of TCE and PCE to groundwater. SWMU 1 and Area 2 were evaluated together because of their geographic proximity. Table 5-1 summarizes those contaminants that pose a risk to either the groundwater or human/ecological receptors. Table 5-2 summarizes the volume and mass of the contaminants in the soil at this site. Figures B-1, B-2, B-3, and B-4 show sampling locations and analytical results from SWMU 1/Area 2. This combined site was evaluated in the FS because groundwater was impacted. This site also poses a potential future threat to beneficial uses of groundwater and background groundwater quality because the contaminants have the potential to migrate to groundwater. In addition, the soil poses a potential risk to depot workers.

Site Characteristics

Past Site Activities

SWMU 1 - Old Sewage Lagoon

- Sanitary sewage effluent was discharged to the lagoon until 1942.
- Lagoons were abandoned and backfilled in 1944.
- Site is the reported location of old sewage lagoons.

- Site is the reported location of a former Area 2 Drum Storage Area.
- Chemicals stored in drums possibly leaked or were discharged accidentally.
- Area 2 was used from 1957 until 1984.

RI/FS Activities

- Site investigation activities at SWMU 1/Area 2 included soil gas surveys, soil sampling, well installation, and groundwater monitoring.
- A WQSA, a fate and transport (F&T) analysis, and a BRA were performed for SWMU 1/Area 2. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- SWMU 1/Area 2 was a source of PCE to the OU 1 groundwater plume.
- Contaminant F&T modeling indicated that PCE in the soil is a potential ongoing threat to beneficial uses of groundwater and to background groundwater. F&T modeling also indicated that TCE in the soil gas is a potential future threat to beneficial uses of groundwater and to background groundwater quality.
- F&T modeling indicated that Aroclor 1260 may be a potential future threat to beneficial uses of groundwater; however, Aroclor 1260 was detected in only one soil sample.

Table 5-1. Summary of Fate and Transport and Risk Data for SWMU 1/Area 2

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	VOCs (TCE, PCE), potentially PCBs (Aroclor 1260)	VOCs (TCE, PCE)	$1x10^{-5}$ depot worker	<1 construction worker	None

Table 5-2. Estimated Volume and Mass of COCs in Soil for SWMU 1/Area 2

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
39,000	PCE: 3.2

5.4.2 Area 1 Building 237 (Group A)

<IMG SCR 98030LE>

5.4.2.1 Tetrachloroethene (PCE) has contaminated soil as the result of past site activities. Area 1 Building 237 was a source of PCE to groundwater. Table 5-3 summarizes the risk of PCE to groundwater and human and ecological receptors. Table 5-4 summarizes the volume and mass of the contaminants in the soil at the site. Figure B-5 shows sampling locations and analytical results from Area 1 Building 237. This site was evaluated in the FS because groundwater was impacted by past site activities. This site also poses a potential future threat to groundwater.

Site Characteristics

Past Site Activities

- Area is north of Building 237. Site is also close to UST 12 and SWMU 33.
- Site is used for cleaning asphalt tools and equipment.

- Solvents were formerly used and stored in this area.
- Site is covered with gravel and asphalt.

RI/FS Activities

- Site investigation activities at Area 1 Building 237 included soil gas surveys, soil sampling, and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for Area 1 Building 237. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- Area 1 Building 237 is a source of PCE to the OU 1 groundwater plume.
- Contaminant F&T modeling indicated that PCE in the soil is a potential ongoing threat to beneficial uses of groundwater and to background groundwater quality.
- Compounds other than PCE were detected in soil, soil gas, and groundwater. However, none exceeded risk criteria or represented a potential or actual threat to beneficial uses of groundwater or background groundwater quality. Thus, these compounds are not considered COCs.

Table 5-3. Summary of Fate and Transport and Risk Data for Area 1 Building 237

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Ecological Hazard Index	Risks
VOCs (PCE)	VOCS (PCE)	1×10^{-6} a construction worker	<1 construction worker	None

Table 5-4. Estimated Volume and Mass of COCs in Soil for Area 1 Building 237

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
8,300	PCE: 6.3

<IMG SCR 98030LF>

5.4.3 Area 3-Drum Storage Area (Group A)

5.4.3.1 Trichoroethene (TCE) and PCE have contaminated soil as the result of past site activities. Area 3 is potentially a continuing source of these contaminants to groundwater. Table 5-5 summarizes those contaminants that pose a risk to either the groundwater or to human/ecological receptors. Table 5-6 summarizes the volume and mass of the contaminants in the soil at this site. Figures B-6 and B-7 show sampling locations and analytical results from Area 3. This site was evaluated in the FS because groundwater was impacted. This site also poses a potential future threat to groundwater quality.

Site Characteristics

Past Site Activities

- Site was used as a drum storage area.
- Stored drums may have leaked or accidentally spilled.
- Site is covered with asphalt.
- No other sites are near Area 3.

RI/FS Activities

- Site investigation activities at Area 3 included soil-gas surveys, soil sampling, and groundwater monitoring.

- An F&T analysis and a BRA were performed for Area 3. A summary of the BRA is presented in Section 6.0.

Conclusions

- Area 3 is a source of PCE and TCE to the OU 1 groundwater plume.

- Contaminant F&T modeling indicated that PCE and TCE in the soil represent a potential ongoing threat to beneficial uses of groundwater and to background groundwater quality.

Table 5-5. Summary of Fate and Transport and Risk Data for Area 3

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	VOCs (PCE, TCE)	VOCs (PCE, TCE) worker	$<1x10^{-6}$ depot worker	<1 depot	None

Table 5-6. Estimated Volume and Mass of COCs in Soil for Area 3

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
25,200	PCE: 5.8 TCE: 10.5

5.5 Group B

5.5.1 SWMU 4-Storm Drain Lagoon (Group B) <IMG SCR 98030LG>

5.5.1.1 Semivolatile compounds, pesticides, herbicides, and metals have contaminated surface sediment as the result of past site activities. Pesticides (simazine, diuron, monuron, and dieldrin) may have contaminated groundwater (see analysis in Appendix Q. Surface water and sediment pose a potential threat to ecological receptors. Table 5-7 summarizes those contaminants that pose a risk to either the groundwater or human/ecological receptors. Monitoring data suggest that the model has overestimated the threat to groundwater quality from this site. Table 5-8 summarizes the volume and mass of the contaminants in the soil at this site. Figures B-8, B-9, and B-10 show sampling locations and analytical results from SWMU 4. Soil/sediment and surface water pose a potential risk to ecological receptors.

Site Characteristics

Past Site Activities

- Storm water from DDJC-Tracy has accumulated in the storm drain lagoon since 1971.

- The storm drain lagoon is unlined and bounded by soil berms that are approximately 6 feet high.

- The storm drain lagoon contains water nearly year-round, and waterfowl inhabit the area.

- The storm drain lagoon reportedly received rinse water from paint-stripping, degreasing, and steam-cleaning operations.

- This area was used for open storage before 1952.

- A stockpile of manganese ore was located northeast of the lagoon area from 1957 to 1968.

RI/FS Activities

- Site investigation activities at SWMU 4 included a soil-gas survey, surface water and sediment sampling, soil sampling, and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were conducted for SWMU 4. A summary of the WQSA and BRA are presented in Section 6.0.

Conclusions

- Dichlorodifluoromethane, chloromethane, and toluene in groundwater are part of the OU 1 groundwater plume; SWMU 4 is not a source of these compounds.
- The pesticides and herbicides simazine, diuron, monuron, and dieldrin cannot be clearly attributed to SWMU 4.
- Contaminant F&T modeling indicated that the pesticides and herbicides carbaryl, carbofaran, chlordane, 2,4-D, and dieldrin in soil or sediment pose a potential future threat to groundwater. Monitoring data (see Appendix C) indicate that an impact is unlikely.
- F&T modeling indicated that the SVOCs bis(2-ethylhexyl)phthalate, fluoranthene, phenanthrene, and pyrene in soil or sediment pose a potential future threat to groundwater. Monitoring data (see Appendix C) indicate that an impact is unlikely.
- The compounds DDD, DDE, and DDT in soil, sediment, or surface water pose a potential risk to ecological receptors. The estimated risk for the metals zinc and selenium in soil or sediment are above the benchmark level for ecological receptors; however, these risks are considered conservative because of the biases in the analytical data.
- Compounds other than those listed above were detected in soil, sediment, surface water, or groundwater; however, none exceeded the risk criteria or represented a potential or actual threat to beneficial uses of groundwater or background groundwater quality. Thus, these compounds are not considered COCs.

Table 5-7. Summary of Fate and Transport and Risk Data for SWMU 4

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	None [a]	None [a]	$<1\times10^{-6}$ depot worker	<1 depot worker	Pesticides (DDD, DDE, DDT), metals (selenium)
Surface Water	None [a]	None [a]	NC [b]	NC [b]	Pesticides (DDD, DDE, DDT)

a See Appendix C for detailed analyses of site-specific data and uncertainties.
b Not calculated.

Table 5-8. Estimated Volume and Mass of COCs in Soil for SWMU 4

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
3,000	Pesticides/PCBs: 5.9

5.5.2 SWMU 6-Building 28 Sump (Group B)

<IMG SRC 98030LH>

5.5.2.1 As the result of past site activities, pesticides and herbicides have contaminated soil. Lindane (a pesticide) has been released to groundwater, and SWMU 6 is probably a former source of TCE and PCE to groundwater. Table 5-9 summarizes those contaminants that pose a potential threat to the groundwater at SWMU 6. Table 5-10 summarizes the volume and mass of the contaminants in the soil at this site. Figure B-11 shows sampling locations and analytical results for SWMU 6. This site was evaluated in the FS because groundwater was impacted and because contaminants in the soil pose a potential future threat to groundwater.

Site Characteristics

Past Site Activities

- This site is the former location of UST 21 and a 250-gallon concrete sump.
- A portion of Building 28 was used for repackaging.
- Wastes from repackaging were collected in the sump.
- The sump operated from approximately 1968 to 1977.
- The sump was initially abandoned in place; it was removed in 1988.

RI/FS Activities

- Site investigation activities at SWMU 6 included soil sampling, a soil gas survey, and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for SWMU 6. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- SWMU 6 was a source of PCE and TCE to the OU 1 groundwater plume.
- The pesticide lindane has impacted groundwater at SWMU 6.
- Contaminant F&T modeling indicated that the pesticides and herbicides dicamba, dieldrin, endrin, heptachlor, lindane, and 2,4,5-T in the soil pose a potential future threat to groundwater.

Table 5-9. Summary of Fate and Transport and Risk Data for SWMU 6

Impacted Medium	Threat to Beneficial Uses of Groundwater [a]	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	Pesticides and herbicides (dicamba, dieldrin, heptachlor, lindane)	Pesticides and herbicides (dicamba, dieldrin, endrin, heptachlor, lindane, 2,4,5-T)	$<1 \times 10^{-6}$ depot worker	<1 depot worker	None

[a] Suspected former source of VOCs to groundwater.

Table 5-10. Estimated Volume and Mass of COCs in Soil for SWMU 6

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
60	Pesticides/PCBs: 0.1

5.5.3 SWMU 7-Burn Pit No. 1 (Group B)

<IMG SRC 98030LI>

5.5.3.1 As the result of past site activities, VOCs, SVOCs, pesticides, herbicides, dioxins/furans, and petroleum hydrocarbons have contaminated soil. Dioxins/furans were found to be extremely immobile in the analytical leaching model and have not been detected in groundwater to date. SVOCs (bis[2-ethylhexyl]phthalate) and pesticides (octachlorocioxin) may have been released to groundwater. Table 5-11 summarizes those contaminants that pose a threat to groundwater at SWMU 7. Table 5-12 summarizes the volume and mass of the contaminants in the soil at this site. Figures B-12 and B-13 show sampling locations and analytical results for SWMU 7. This site was evaluated in the FS because groundwater was impacted and because the contaminants in the soil pose a potential future threat to groundwater.

Site Characteristics

Past Site Activities

- SWMU 7 is the site of seven pits (Pits A-G) now partially or completely beneath Buildings 15, 19, and 21.

- The pits may have been up to 16 feet deep.

- The pits were reportedly used between 1942 and 1954 for disposing of medical supplies containing mercury and phosphate compounds, narcotics, pharmaceuticals, radiological supplies, and electron tubes.

- Solids and liquids stored or used at the depot may have been buried or burned in the pits.

RI/FS Activities

- Site investigation activities at SWMU 7 included a geophysical survey, soil gas surveys, radionuclide, screening, soil sampling, trenching, monitoring well installation, and groundwater monitoring.

- A WQSA, an F&T analysis, and a BRA were performed for this site. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- Groundwater has been impacted by bis(2-ethylhexyl)phthalate and octachlorocioxin.

- Contaminant F&T modeling indicated that contaminants in the soil pose a potential future threat to groundwater. These contaminants are:
    - Pit F: VOCs (1,2-DCE, TCE)
    - Pit C: SVOCs(bis[2 ethylhexyl]phthalate)
    - Pesticides and herbicides (dieldrin, linuron)
    - Pit D: Pesticides and herbicides (2,4-D, dieldrin, linuron, simazine)
    - Petroleum hydrocarbons (TPH-diesel)

Table 5-11. Summary of Fate and Transport and Risk Data for SWMU 7

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	Pit F: VOCs (1,2-DCE, TCE)	Pit F: VOCs (1,2-DCE, TCE)	<1x10 -6 construction worker	9.2 construction worker (manganese, PAHs)	None
	Pit C: Pesticides and herbicides (dieldrin, linuron)	Pit C: Pesticides and herbicides (dieldrin, linuron), SVOCs (bis[2-ethylhexyl]phthalate)			
	Pit D: Pesticides and herbicides (dieldrin, linuron, simazine), petroleum hydrocarbons (TPH as diesel)	Pit D: Pesticides and herbicides (2,4-D, dieldrin, linuron, simazine), petroleum hydrocarbons (TPH as diesel)			

Table 5-12. Estimated Volume and Mass of COCs in Soil for SWMU 7

Volume of Impacted Soil (yd)	Mass of COCs (pounds)
3,630	SVOC: 2.9
	Dioxin/Furan: 6.2x10 -6
	Pesticides/PCBs: 2.9
	Herbicides: 0.01

5.5.4 SWMU 8-Burn Pit No. 2 (Group B)

<IMG SRC 98030LJ>

5.5.4.1 Semivolatile organic compounds (SVOCs), pesticides and herbicides, dioxins/furans, and petroleum hydrocarbons have contaminated soils as the result of past site practices. Dioxins/furans are present in soil just above groundwater, but the toxicity equivalent value in groundwater was extremely low (about 10 -7 Ig/L) and two orders of magnitude below the federal MCL for 2,3,7,8-tetrachlorodibenzo-p-dioxin. Pesticides (chlordane, DDD, DDE, and DDT) have been released to groundwater, and SWMU 8 is probably a former source of VOCs (PCE and TCE) to groundwater. Table 5-13 summarizes those contaminants that pose a potential threat to the groundwater and a potential risk to construction workers at SWMU 8. Table 5-14 summarizes the volume and mass of the contaminants in the soil at the site. Figures B-14, B-15, and B-16 show sampling locations and analytical results for SWMU 8. This site was evaluated in the FS because groundwater was impacted, because contaminants in the soil pose a potential future threat to groundwater, and because contaminants in the soil pose a potential risk to construction workers.

Site Characteristics

Past Site Activities

- SWMU 8 is a single large burn pit that reportedly operated between 1942 and 1971.
- Various containers, crates, wooden pallets, trash, unknown solids and liquids, and narcotics were burned in the pit.
- Explosions, attributed to intermixing liquid chemicals or burning pressurized containers, were reported (in interviews) as common in the burn pit.

RI/FS Activities

- Site investigation activities at SWMU 8 included geophysical surveys, soil-gas surveys, soil sampling, radionuclide screening, trenching, monitoring well installation, and groundwater monitoring.

- A WQSA, an F&T analysis, and a BRA were performed for this site. Summaries of the WQSA and the BRA are provided in Section 6.0.

Conclusions

- SWMU 8 is a possible source of PCE and TCE to the OU 1 groundwater plume.

- Groundwater at SWMU 8 has also been adversely impacted by the pesticides chlordane, DDD, DDE, and DDT.

- Contaminant F&T modeling indicated that the contaminants bis(2-ethylhexyl)phthalate, diethylphthalate, 2,4-dinitrotoluene, naphthalene, chlordane, 2,4-D, DDD, DDE, DDT, dieldrin, lindane, linuron, MCPA, simazine, TPH as gasoline, TPH as diesel, and TPH as motor oil in the soil pose a potential future threat to groundwater.

- The contaminants dieldrin, DDD, and DDE also pose a potential risk to construction workers at the site.

Table 5-13. Summary of Fate and Transport and Risk Data for SWMU 8

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	SVOCs (2,4-dinitrotoluene, naphthalene) [a]	SVOCs (bis[2-ethylhexyl]phthalate, diethylphthalate, 2,4-dinitroutoluene, naphthalene) [a]	$<1\times10^{-6}$ to 1×10^{-4} construction worker (total DDX and dieldrin)	17 construction worker	None
	Pesticides and herbicides (total chlordane, 2,4-D, DDD, dieldrin, lindane, linuron, MCPA, simazine)	Pesticides and herbicides (total chlordane, 2,4-D, DDD, DDE, DDT, dieldrin, lindane, linuron, MCPA, simazine)			
	Petroleum hydrocarbons (TPH as gasoline, TPH as diesel, TPH as motor oil)	Petroleum hydrocarbons (TPH as gasoline, TPH as diesel, TPH as motor oil)			

[a] Suspected former source of VOCs to groundwater.

Table 5-14. Estimated Volume and Mass of COCs in Soil for SWMU 8

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
2,630	SVOCs: 6.5 TPH: 2,242.2 Pesticides/PCBs: 143.2 Herbicides: 0.2

5.5.5 SWMU 20: Aboveground Solvent Tank and Area 1 Building 10 (Group B)

<IMG SRC 98030LK>

5.5.5.1 Volatile organic compounds (VOCs), SVOCs, pesticides and herbicides, and petroleum hydrocarbons have contaminated soil as the result of past site activities. PCE, TCE, and various pesticides and herbicides (monuron, diuron, alpha-BHC, methiocarb, and 2,4-D) may have contaminated groundwater. Table 5-15 summarizes those contaminants that pose a threat to groundwater at SWMU 20. Table 5-16 summarizes the volume and mass of the contaminants in the soil at this site. Figures B-17 and B-18 show sampling locations and analytical results for SWMU 20. This site was evaluated in the FS because groundwater was impacted and because contaminants in the soil pose a potential future threat to groundwater.

Site Characteristics

Past Site Activities

SWMU 20 - Aboveground Solvent Tank

- SWMU 20 included a 500-gallon aboveground solvent (TCE) degreasing unit located inside Building 10.
- Building 10 was constructed in 1950. According to warehouse plans, several cleaning facilities were used at various times from 1950 to 1974.
- A spray paint booth and cleaning operations were reportedly connected to a sump (Manhole W-1 of the IWPL [SWMU 33]).
- UST Site 13 is close to SWMU 20. This site reportedly contained a 2,000-gallon No. 2 fuel oil tank, which was removed in 1987.

RI/FS Activities

- Site investigation activities at SWMU 20 included soil-gas surveys, soil sampling, sump sampling, pipeline inspection, monitoring well installation, and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for SWMU 20. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- SWMU 20 was a source of TCE and PCE to the OU 1 groundwater plume.
- Groundwater has also been impacted by monuron, diuron, alpha-BHC, methiocarb, and 2,4-D.
- Contaminant fate and transport modeling indicated that TCE, ethylbenzene, xylenes, diethylphthalate, 2,4-dinitrophenol, pentachlorophenol, 2,4,6-trichlorophenol, dieldrin, methiocarb, MCPA, linuron, and TPH-diesel in soil pose a potential future threat to groundwater.

Table 5-15. Summary of Fate and Transport and Risk Data for SWMU 20

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	VOCs (TCE)	VOCs (TCE, ethylbenzene, xylenes)	$<1x10^{-6}$ a depot worker	<1 a depot worker	None
	SVOCs (2,4-dinitrophenol, 2,4,6-trichlorophenol)	SVOCs (diethylphthalate, 2,4-dinitrophenol, pentachlorophenol, 2,4,6-trichlorophenol)			
	Pesticides and herbicides (methiocarb, MCPA, linuron)	Pesticides and herbicides (dieldrin, methiocarb, MCPA, linuron)			
	Petroleum hydrocarbons (TPH as diesel)	Petroleum hydrocarbons (TPH as diesel)			

a Site does not contribute to overall risk levels for the exposure unit.

Table 5-16. Estimated Volume and Mass of COCs in Soil for SWMU 20

Volume of Impacted Soil (yd 3)	Mass of COCs (pounds)
320	SVOCs: 61.2 VOCs: 0.1 TPH: 68.0 Pesticides/PCBs: 0.1 Herbicides: 0.01

5.5.6 SWMU 24-Petroleum Waste Oil Tank (Group B)

<IMG SRC 98030LL>

5.5.6.1 Volatile organic compounds (VOCs), SVOCs, pesticides, PCBs, and petroleum hydrocarbons have contaminated soil as the result of past site activities. TPH as gasoline may have been released to the groundwater at SWMU 24. Table 5-17 summarizes those contaminants that pose a threat to groundwater or a risk to human receptors. Table 5-18 summarizes the volume and mass of the contaminants in the soil at this site. Figure B-19 shows sampling locations and analytical results for SWMU 24. This site was evaluated in the FS because contaminants in the soil pose a potential future threat to groundwater and because there is a potential risk to future depot workers.

Site Characteristics

Past Site Activities

- A 500-gallon underground steel tank stored petroleum wastes from materials testing in Building 247.
- The tank was used from 1961 until it was removed in 1988.
- A visual inspection conducted during tank removal revealed pin holes in the base of the tank.

RI/FS Activities

- Site investigation activities at SWMU 24 included soil sampling, monitoring well installation, groundwater monitoring, and air monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for SWMU 24. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- SWMU 24 is located within the OU 1 groundwater plume; however, it is not a source of contaminants to OU 1.
- TPH as gasoline may have been released to groundwater; however, its extent is extremely limited.
- The contaminants acetone, 2-butanone, ethylbenzene, 2-hexanone, 4-methyl-2-pentanone, toluene, xylenes, 2,4-dimethylphenol, fluoranthene, 2-methylnaphthatene, 4-methylphenol, naphthalene, phananthrene, phenol, pyrene, TPH-gasoline, TPH-diesel, PCBs (Aroclor - 1260), carbofuran, lindane, phorate, and ronnel in the soil pose a potential future threat to groundwater.
- There is a potential risk to future depot workers from manganese.

Table 5-17. Summary of Fate and Transport and Risk Data for SWMU 24

Impacted Medium	Threat to Beneficial uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	VOCs (Acetone, 2-butanone, ethylbenzene, 2-hexanone, toluene, xylenes)	VOCs (Acetone, 2-butanone, ethylbenzene, 2-hexanone, 4-methyl-2-pentanone [MIBK], toluene, xylenes)	$<1x10^{-6}$ construction worker	10 future depot worker (manganese)	None
	SVOCs (2,4-dimethylphenol, 2-methylnaphthalene, 4-methylphenol, naphthalene, phenanthrene, phenol, pyrene)	SVOCs (2,4-dimethylphenol, fluoranthene, 2-methylnaphthalene, 4-methylphenol, naphthalene, phenanthrene, phenol, pyrene)			
	Pesticides and PCBs (Aroclor 1260, carbofuran, lindane, phorate)	Pesticides and PCBs (Aroclor 1260, carbofuran, lindane, phorate, ronnel)			
	Petroleum hydrocarbons (TPH as diesel, TPH as gasoline)	Petroleum hydrocarbons (TPH as diesel, TPH as gasoline)			

Table 5-18. Estimated Volume and Mass of COCs in Soil for SWMU 24

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
244	SVOCs: 0.2
	VOCs: 205
	TPH: 545
	Pesticides/PCBs: 0.1

5.5.7 SWMU 27-Building 206 Roundhouse Sump/Area 1 Building 206 (Group B)

<IMG SRC 98030LM>

5.5.7.1 Volatile organic compounds (VOCs), SVOCs, herbicides, PCBs, and petroleum hydrocarbons have contaminated soil as the result of past site activities. Groundwater has not been impacted. VOCs, herbicides, and petroleum hydrocarbons pose a potential threat to the beneficial uses of groundwater and the background groundwater quality. Table 5-19 summarizes those contaminants that pose a potential threat to the groundwater at SWMU 27 or a potential risk to human receptors. Table 5-20 summarizes the volume and mass of the contaminants in the soil at this site. Figures B-20, B-21, and B-22 show sampling locations and analytical results for SWMU 27. This site was evaluated in the FS because contaminants in the soil pose a potential threat to groundwater and because there is a potential risk to depot workers.

Site Characteristics

Past Site Activities

- SWMU 27 includes the waste oil sump for the Area 1 Building 206 railroad roundhouse.
- Aerial photographs indicate that Building 206 existed in 1945.
- Fluids from cleaning the exteriors of locomotives reportedly drained into the sump.
- Pesticides were reportedly applied inside Building 206.

- A service pit in Building 206 may have been used to transfer fuel oil from UST Site 7 to the boiler room located in Building 206.

RI/FS Activities

- Site investigation activities at SWMU 27 included soil sampling, sludge sampling, monitoring well installation, and groundwater monitoring.

- A WQSA, an F&T analysis, and a BRA were performed for SWMU 27. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- Contaminant F&T modeling indicated that the compounds TCE, benzo(a)pyrene, total PAHs, 2,4-D, MCPA, PCBs (Aroclor 1260), 2,4,5-T, and TPH as motor oil in the soil pose a potential future threat to groundwater.

- The compounds benzo(a)pyrene and PCBs (Aroclor 1260) pose a potential risk to depot workers.

Table 5-19. Summary of Fate and Transport and Risk Data for SWMU 27 and Area 1 Building 206

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil		VOCs (TCE)	3x10^{-4} depot worker (benzo[a], pyrene, total PAHs, and PCBs)	>1 depot worker	None
	Herbicides (MCPA)	Herbicides (2,4-D, MCPA, 2,4,5-T)			
	Petroleum hydrocarbons (TPH as motor oil)	Petroleum hydrocarbons (TPH as motor oil)			

Table 5-20. Estimated Volume and Mass of COCs in Soil for SWMU 27 and Area 1 Building 206

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
130	SVOCs: 10.5
	TPH: 1,512
	Herbicides: 0.6

5.5.8 Building 30 Drum Storage Area (Group B)

<IMG SRC 98030LN>

5.5.8.1 Semivolatile organic compounds (SVOCs) have contaminated soil as the result of past site activities. These compounds pose a potential threat to the beneficial uses of groundwater and the background groundwater quality; however, groundwater is not currently impacted. Table 5-21 summarizes those contaminants in soil that pose a potential threat to Area groundwater at the Building 30 Drum Storage Area. Table 5-22 summarizes the volume and mass of the contaminants in the soil at this site. Figure B-23 shows sampling locations and analytical results for Building 30 Drum Storage Area. This site was evaluated in the FS because contaminants in the soil pose a potential threat to groundwater.

Site Characteristics

Past Site Activities

- The site is partially covered by the Consolidated Subsistence Facility (which was constructed in 1992) and is located in the southern portion of DDJC-Tracy.

- Solvents were reportedly stored in drum storage areas at DDJC-Tracy.

- The site history indicates that petroleum hydrocarbons or metal-containing wastes were stored at Building 30.

RI/FS Activities

- Site investigation activities at the Building 30 Drum Storage Area included soil sampling. No groundwater samples were collected at this site.

- An F&T analysis and a BRA were performed for this site. A summary of the results of the BRA is presented in Section 6.0.

Conclusions

- Contaminant F&T modeling indicated that the compounds benzyl alcohol, bis(2-ethylhexyl) phthalate, diethylphthalate, and di-n-butylphthalate in the soil pose a potential future threat to groundwater.

Table 5-21. Summary of Fate and Transport and Risk Data for Building 30 Drum Storage Area

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	SVOCs (bis[2-ethylhexyl] phthalate, di-n-butylphthalate)	SVOCs (benzyl alcohol, bis[2-ethylhexyl]phthalate, diethylphthalate, di-n-butylphthalate)	<1xl0 -6a depot worker	<1 a depot worker	None

a Site does not contribute to overall risk levels for the exposure unit.

Table 5-22. Estimated Volume and Mass of COCs in Soil for Building 30 Drum Storage Area

Volume of Impacted Soil (Yd 3)	Mass of COCs (pounds)
2,780	SVOCs: 311

5.5.9. Surface and Near-Surface Soils-Northern Depot Area (Group B)

<IMG SCR 98030LO>

5.5.9.1 Pesticides and metals have contaminated soils as the result of past site activities. Table 5-23 summarizes those contaminants that pose a potential threat to human receptors. Table 5-24 summarizes the volume and mass of the contaminants at this site. Figures B-24 and B-25 show sampling locations and analytical results for the Northern Depot soils. This site was evaluated in the FS because of the potential risk to human receptors.

Site Characteristics

Past Site Activities

- The northern depot is a nonvegetated area of bare soil.

- The site was reportedly used as a storage area for the National Stockpile of Strategic Metals.

- From 1980 to 1986, lead ballast was stored in this area.

- From shortly after World War II until the 1980s, ferrous chromium ore was stored in Quadrants VII and VII.

- From shortly after World War II until the 1970s, manganese ore was also stored in this area.

RI/FS Activities

- Site investigation activities in the Northern Depot Area included soil sampling (surface and near surface) and respirable dust level measurements.

- An F&T analysis and a BRA were conducted for this site. A summary of the BRA is presented in Section 6.0.

Conclusions

- Contaminant F&T modeling indicated that none of the contaminants in the soil poses a potential threat to groundwater.

- The metals arsenic and manganese pose a potential risk to a grader operator.

- The pesticides and herbicides DDD, DDE, DDT, chlordane, dieldrin, endrin, and lindane were detected in the soil at concentrations that exceeded established background threshold levels; however, none of the concentrations exceeded the risk criteria or posed a potential future risk to groundwater.

Table 5-23. Summary of Fate and Transport and Risk Data for Northern Depot Soils

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	None	None	< 1x10 -6 grader operator	> 1 grader operator (arsenic and manganese)	None

Table 5-24. Estimated Volume and Mass of COCs In Soil for Northern Depot Area

Volume of Impacted Soil (yd 3)	Mass of COCs (pounds)
60,820	Metals: 62,827

5.6 Group C

5.6.1 SWMU 2-Sewage Lagoons and SWMU 3-Industrial Waste Lagoons

<IMG SCR 98030LP>

5.6.1.1 SWMU 2 and SWMU 3 were investigated concurrently. SVOCs, pesticides and herbicides, and metals have contaminated soil as the result of past site activities. Pesticides and herbicides are also present in surface water. In addition, pesticides and herbicides (dieldrin, monuron, diuron, aldrin, chlordane, 2,4-D, DDD, DDE, DDT, delta-BHC, endosulfan, sulfate, endrin, heptachlor epoxide, linuron, and simazene) have been released to groundwater; VOCs in groundwater are part of the OU 1 plume. Both soil and surface water pose a threat to ecological receptors. Table 5-25 summarizes those contaminants that pose a risk either to the groundwater or to human/ecological receptors at SWMU 2. Table 5-26 summarizes those contaminants that pose a risk to either the groundwater or human/ecological receptors at SWMU 3. Table 5-27 summarizes the volume and mass of the contaminants in the soil at SWMU 2 and SWMU 3. Figures B-26, B-27, and B-28 show sampling locations and analytical results from SWMU 2 and SWMU 3. These sites were evaluated in the FS because groundwater was impacted, because these sites pose a future potential threat to groundwater, there is also a potential risk to ecological receptors from soil, sediment, and surface water.

Site Characteristics of SWMU 2

Past Site Activities

- The site consists of two active sewage lagoons that have been in operation since 1942.

- The lagoons are unlined and bounded by earthen berms.

- The northern lagoon supports abundant vegetation and animal life; this lagoon is cleared annually, sometimes by burning. The southern lagoon contains grassy vegetation and reeds.

- The lagoons currently receive treated effluent discharged from the sewage treatment plant.

- The lagoons previously received effluent from the motor pool wash rack.

- Sometime between 1971 and 1979 industrial wastes from SWMU 3 (Industrial Waste Lagoons) overflowed into the southern lagoon of SWMU 2.

RI/FS Activities

- Site investigation activities at SWMU 2 included soil/sediment sampling, surface water sampling, evaluation of hexavalent chromium in soils, well installation, and groundwater monitoring.

- A WQSA, an F&T analysis, and a BRA were performed for SWMUs 2 and 3. Summaries of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- PCE and TCE detected in groundwater are part of the OU 1 groundwater plume; SWMUs 2 and 3 are not a source of these compounds.

- The pesticides and herbicides dieldrin, monuron, diuron, aldrin, chlordane, 2,4-D, DDD, DDE, DDT, delta-BHC, endosulfan, sulfate, endrin, heptachlor epoxide, linuron, and simazine have impacted groundwater at SWMUs 2 and 3; dieldrin, monuron, and diuron are the most prevalent.

Table 5-25. Summary of Fate and Transport and Risk Data for SWMU 2

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	SVOCs (bis[2-ethylhexyl] phthalate, 4-methylphenol), pesticides and herbicides (aldrin, dieldrin, diuron, lindane, monuron, heptachlor)	SVOCs (bis[2-ethylhexyl] phthalate, 2,4-dimethyl-phenol, di-n-butylphthalate, 4-methylphenol) Pesticides and herbicides (aldrin, total chlordane, DDD, DDE, DDT, dieldrin, diuron, endrin, lindane, monuron, 2,4-D, heptachlor)	$< 1x10^{-6}$ depot worker	>1 depot worker (chlordane, DDX)	Pesticides (DDD, DDE, DDT), metals (selenium, lead)
Surface Water	Pesticides and herbicides (DDD, DDE, DDT, 2,4-D, dieldrin, diuron, linuron, oxamyl, simazine, stirofos)	Pesticides and herbicides (DDD, DDE, DDT, 2,4-D, dieldrin, diuron, linuron, oxamyl, simazine, stirofos)	NC	NC	Pesticides (DDD, DDE, DDT)

5.6.2 SWMU 3-Industrial Waste Lagoons

<IMG SCR 98030LQ>

Site Characteristics of SWMU 3

Past Site Activities

- The site consists of two lined industrial waste lagoons that are situated within a larger sanitary sewage lagoon (SWMU 2).

- The smaller lagoon was installed in 1972 and was unlined during its first year of use.

- The larger lagoon was installed between 1975 and 1979 and was lined at time of construction.

- Historically, the lagoons received wastewater from the IWPL that included effluent from the recoup operations from Building 26 (wastewater from repackaging of petroleum products) and effluent from Building 10 (wastewater from paint-stripping, degreasing, and steam-cleaning operations).

- Phostoxin (an insecticide and rodenticide) was released into the lagoon several times between 1975 and 1979.

- Currently, no effluent is entering the lagoons.

Conclusions

- Contaminant F&T modeling indicated that the pesticides and herbicides aldrin, chlordane, DDD, DDE, DDT, dieldrin, diuron, endrin, lindane, monuron, 2,4-D, and heptachlor epoxide in the soil, sediment, and surface water pose a potential future risk to groundwater.

- The pesticides and herbicides listed in the previous bullet point also pose a potential risk to ecological receptors in the surface water and soil. In addition, the estimated risk for selenium in soil, sediment, or surface water is above the benchmark level for ecological receptors; however, this risk is considered conservative because of the biases in the analytical data.

- Compounds besides those listed above were detected in soil, sediment, and groundwater; however, none exceeded the risk criteria or represented a potential or actual threat to beneficial uses of groundwater or background groundwater quality. Thus, these compounds are not considered COCs.

- Contaminant F&T modeling indicated that the SVOCs bis(2-ethylhexyl)phthalate, 2,4-dimethylphenol, di-n-butylphthalate, and 4-methylphenol in the soil or sediment pose a potential future risk to groundwater.

Table 5-26. Summary of Fate and Transport and Risk Data for SWMU 3

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	SVOCs (bis[2-ethylhexyl] phthalate, 4-methylphenol) Pesticides and herbicides (aldrin, dieldrin, diuron, lindane, monuron, heptachlor), metals (mercury)	SVOCs (bis[2-ethylhexyl] phthalate, 2,4-dimethylphenol, di-n-butylphthalate, 4-methylphenol) Pesticides and herbicides (aldrin, total chlordane, DDD, DDE, DDT, DDX, dieldrin, diuron, endrin, lindane, monuron, 2,4-D, heptachlor)	3×10^{-6} depot worker (chlordane, DDX)	<1 depot worker	Pesticides
Surface Water	Pesticides and herbicides (DDD, DDE, DDT, 2,4-D, dieldrin, diuron, linuron, oxamyl, simazine, stirofos)	Pesticides and herbicides (DDD, DDE, DDT, 2,4-D, dieldrin, diuron, linuron, oxamyl, simazine, stirofos)	NC	NC	Pesticides (DDD,DDE, DDT)

NC = not calculated

Table 5-27. Estimated Volume and Mass of COCs in Soil for SWMU 2 and 3

Volume of Impacted Soil (yd^3)	Mass of COCs (pounds)
10,000	Pesticides and herbicides: 102

5.6.3 SWMU 33-Industrial Waste Pipeline (Group C)

5.6.3.1 Volatile organic compounds (VOCs), SVOCs, pesticides, herbicides, and petroleum hydrocarbons have contaminated soil as the result of past site activities. SWMU 33 was also a source of VOCs (xylenes, TCE, PCE< 1,1-DCE, 1,1-TCA, 1.1-DCA, and 1,2-DCE) and pesticides (DDD, DDE, DDT, monuron, diuron, alpha-BHC, and dieldrin) to groundwater. Ethylbenzene has also been detected in soil at this site. Table 5-28 summarizes those contaminants that pose a risk to either the groundwater or human/ecological receptors at SWMU 33. Table 5-28 summarizes the volume and mass of the contaminants in the soil at SWMU 33. Figure B-29 shows sampling locations and analytical results from SWMU 33. This site was evaluated in the FS because groundwater was impacted and because there is a potential future threat to groundwater from contaminants in the soil.

<IMG SRC 98030LR>

Site Characteristics

Past Site Activities

- Historically, waste streams from various shops performing unit operations have been routed to the industrial waste lagoons (SWMU 3) via the industrial waste pipeline (IWPL).

- The IWPL was constructed in 1972.

- The IWPL is buried approximately 2 to 4 feet below ground surface.

- The IWPL is constructed of various materials, including transite, vitrified clay pipe, and polyvinyl chloride (PVC).

- There are two major lines from the IWPL. Both the south IWPL and its branches and the east IWPL and its branches are approximately 1,200 feet in length.

RI/FS Activities

- Site investigation activities at SWMU 33 included soil-gas surveys, soil sampling, well installation groundwater monitoring, surface water and sediment sampling, a pipeline assessment, video inspection, air and smoke testing and sump sampling. A removal action is proposed for this site.

- A WQSA, an F&T analysis, and a BRA were performed for SWMU 33. A summary of the WQSA and the BRA are presented in Section 6.0.

Conclusions

- SWMU 33 was a probable source of TCE, PCE, chloroform, 1,1-DCA, and 1,2-DCE in the OU 1 groundwater plume.

- SWMU 33 was also a source of DDD, DDE, DDT, monuron, diuron, alpha-BHC, and dieldrin to groundwater.

- Contaminant F&T modeling indicated that xylenes, diethylphthalate, di-n-butylphthalate, naphthalene, aldrin, carbaryl, dieldrin, methiocarb, and TPH as diesel in the soil are potential threats to groundwater.

- Compounds besides those listed above were detected in soil, soil gas, and groundwater; however, none exceeded the risk criteria or represented a potential or actual threat to beneficial uses of groundwater or background groundwater quality. Thus, these compounds are not considered COCs.

Table 5-28. Summary of Fate and Transport and Risk Data for SWMU 33

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	SVOCs (naphthalene)	Vocs (xylenes) a SVOCs (diethylphthalate, di-n-ibutylphthalate, naphthalene)	<1X10 -6 construction worker	<1 construction worker	None
	Pesticides (carbaryl, methiocarb)	Pesticides (aldrin, carbaryl, dieldrin, methiocarb)			
	Petroleum hydrocarbons (TPH as diesel)	Petroleum hydrocarbons (TPH as diesel)			

a Suspected former source of VOCs to groundwater.

Table 5-29. Estimated Volume and Mass of COCs in Soil for SWMU 33

Volume of Impacted Soil (yd 3)	Mass of COCs (pounds)
33	SVOCs: 1.2 TPH: 750 Pesticides/PCBs: 0.04

5.7 No Further Action Sites

5.7.1 SWMU 5-Old Industrial Lagoon, Building 255 (No Further Action)

5.7.1.1 Soil and groundwater have not been adversely impacted; therefore, this site is recommended for no further action. Groundwater beneath this site is within the area of OU 1 groundwater contamination; however, the source of TCE in groundwater was not SWMU 5. Table 5-30 summarizes the F&T and risk data for SWMU 5. Figure B-30 shows sampling locations and analytical results from SWMU 5.

<IMG SRC 98030LS>

Site Characteristics

Past Site Activities

- The site is located north of Building 255 and south of the railroad tracks.
- The site was constructed by 1952 based on aerial photographs.
- The lagoon received rinse water from paint-spraying and paint-stripping operations in Building 255.
- The lagoon was enlarged in 1963 and existed until at least 1971.
- In 1972 or 1973, the unlined lagoon was cleaned and backfilled.
- The area is not paved and contains slight topographic depressions where water ponds during the rainy season.

RI/FS Activities

- Site investigation activities included a geophysical survey, a soil-gas survey, soil sampling, and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for SWMU 5. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-30. Summary of Fate and Transport and Risk Data for SWMU 5

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 depot worker	<1 depot worker	None

5.7.2 SWMU 9-Subsistence Waste Pit (No Further Action)

5.7.2.1 Soil and groundwater have not been adversely impacted by past practices at SWMU 9; therefore, this site is recommended for no further action. Table 5-31 summarizes the F&T and risk data for SMMU 9. Figure B-31 shows sampling locations and an analytical results from SWMU 9.

Site Characteristics

Past Site Activities

- The site is located in the eastern portion of DDJC-Tracy.

- Subsistence waste, primarily food, was reported to have been buried in the pit beginning in 1947. Packaging materials were also buried.

<IMG SRC 98030LT>

RI/FS Activities

- Site investigation activities included a geophysical survey, soil sampling, well installation, and groundwater monitoring.

- WSQA, an F&T analysis, and a BRA were performed for SWMU 9. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-31. Summary of Fate and Transport and Risk Data for SWMU 9

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	< 1x10 -6 construction worker	< 1 construction worker	None

5.7.3 SWMU 10-Medical Waste Burial Pit(No Further Action)

5.7.3.1 Soil and groundwater have not been adversely impacted by past practices at SWMU 10: therefore, the site is recommended for no further action. Table 5-32 summarizes the F&T and risk data for SWMU 10. Figure B-32 shows sampling locations and analytical results from SWMU 10.

Site Characteristics

Past Site Activities

- The site is located in the open area south of Buildings 21 and 22 along the southeastern margin of DDJC-Tracy.

- The site is a former medical waste burial pit.

- Outdated medical supplies, including narcotics, mercury, and phosphate compounds, were buried at this site.

- Aerial photographs show that the pit operated from approximately 1949 until 1965.

- Since 1967, this area has been used for storing truck trailers.

<IMG SRC 98030LU>

RI/FS Activities

- Site investigation activities included a geophysical survey, soil-gas surveys trench excavations, soil sampling, and groundwater monitoring.

- A WQSA, an F&T analysis, and a BRA were performed for SWMU 10. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-32. Summary of Fate and Transport and Risk Data for SWMU 10

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	< 1x10 -6 depot worker	< 1 depot worker	None

5.7.4 SWMU 10A-Possible Medical Waste Burial Pit (No Further Action)

5.7.4.1 Although soil has been contaminated with SVOCs and metals, the groundwater has not been adversely affected by this contamination. Therefore, the site is recommended for no further action. Table 5-33 summarizes the F&T and risk data for SWMU 10A. Figure B-33 shows sampling locations and analytical results from SWMU 10A.

5.7.4.2 Appendix T.3 of the RI/FS (Montgomery Watson, 1996a) evaluated the feasibility of remediating diethylphthalate and di-n-butylphthalate at this site. Excavation of the contaminated soil was estimated to cost $2,047,000. Because these phthalates were suspected lab contaminants, the expenditure to remediate this site was not considered justified.

<IMG SRC 98030LV>

Site Characteristics

Past Site Activities

- The site is located in an open area south of Buildings 13 and 14 in the southern portion of DDJC-Tracy.
- The pit was reportedly used to bury medical supplies.
- A 1945 aerial photograph shows three large strips of disturbed ground, possibly trench scars. These scars are evident in photographs through 1967.
- The 1969 photographs show undisturbed surface and a parking lot on the north side of the area. The area in the immediate vicinity is slightly vegetated.

RI/FS Activities

- Site investigation activities included a geophysical survey, a trench investigation, soil-gas surveys, soil sampling, and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for SWMU 10A. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-33. Summary of Fate and Transport and Risk Data for SWMU 10

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	SVOCs (diethylphthalate, di-n-butylphthalate)	SVOCs (diethylphthalate, di-n-butylphthalate) Pesticides (DDD, DDE, DDT) Metals (Antimony)	<1x10 -6 Construction Worker	< 1 construction Worker	None

5.7.5 SWMU 11-Burial of Lime/Foot Bath (No Further Action)

5.7.5.1 No evidence of disposal activities has been identified; therefore, the site is recommended for no further action. Table 5-34 summarizes the F&T and risk data for SWMU 11. Figure B-34 shows sampling locations and analytical results from SWMU 11.

Site Characteristics

Past Site Activities

- The site is located along the west side of Building 13 in the southern portion of DDJC-Tracy.
- The site was reportedly a burial site for disposing of lime materials associated with lime/foot baths.
- The area is currently covered with asphalt.
- No evidence of disposal activities was identified based on Phase I RI activities.

<IMG SRC 98030LU>

RI/FS Activities

- Site investigation activities included a soil-gas survey and a geophysical survey. Because no anomalies were detected during the geophysical survey, soil sampling and groundwater sampling were not conducted.
- A WQSA was not conducted at SWMU 11. It is likely that the materials reportedly disposed of at SWMU 11 were actually disposed of at SWMU 10A. Thus, SWMU 11 may have been misidentified. A BRA was performed for SWMU 11. A summary of the BRA is presented in Section 6.0.

Table 5-34. Summary of Fate and Transport and Risk Data for SWMU 10

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	$< 1x10^{-6}$ depot worker	< 1 depot worker	None

5.7.6 SWMU 12-Embalming Fluid Dump (No Further Action)

5.7.6.1 Soil and groundwater have not been adversely impacted by past practices at SWMU 12; therefore, the site is recommended for no further action. Table 5-35 summarizes the F&T and risk data for SWMU 12. Figure B-35 shows sampling locations and analytical results from SWMU 12.

Site Characteristics

Past Site Activities

- The site is located on the southern portion of DDJC-Tracy, just east of Building 30, Consolidated Subsistence Facility.
- The site operated between 1945 and 1946.
- An unknown but substantial quantity of embalming fluid containing formaldehyde was buried just east of Building 30, Consolidated Subsistence Facility.
- Surface drainage is to a topographic low west of the site.
- The area is not paved.

<IMG SRC 98030LX>

RI/FS Activities

- Site investigation activities included a geophysical survey, a soil-gas survey, soil sampling, and groundwater sampling from a HydroPunch sample (HP28), and groundwater monitoring.
- A WQSA, an F&T analysis, and a BRA were performed for SWMU 12. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-34. Summary of Fate and Transport and Risk Data for SWMU 10

Threat to Beneficial Uses of Groundwater	Threat to Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	< 1x10 -6 depot worker	< 1 depot worker	None

<IMG SRC 98030LY>

5.71 SWMU 14-Lube Oil Dump (No Further Action)

5.7.7.1 Semivolatile organic compounds (SVOCs), pesticides, TPH, and metals have been released to the soil, but do not pose a threat to groundwater. Groundwater has not been adversely impacted by past activities at SWMU 14; therefore, the site is recommended for no further action. Table 5-36 summarizes the F&T and risk data for SWMU 14. Figuire B-36 shows sampling locations and analytical results from SWMU 14.

Site Characteristics

Past Site Activities

- The site is located on the southern end of DDJC-Tracy, just east of Building 30, Consolidated Subsistence Facility.
- The site was reportedly a former lube oil dump.
- Reportedly, 150 drums of new lube oil were emptied into a trench in 1976. The trench was backfilled with soil.
- A 1980 aerial photograph shows oil seepage visible on the surface.
- During the installation of a water line across the site in 1992, workers reported a black, viscous substance in the west wall of the trench.
- The area is unpaved.

RI/FS Activities

- Site investigation activities included geophysical surveys, soil-gas surveys, soil sampling, trenching investigations, well installations, and groundwater monitoring,
- An F&T analysis, a WQSA and a BRA were performed for SWMU 14. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 14

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	< 1x10 -6 construction worker	< 1 construction worker	None

<IMG SRC 98030LZ>

5.7.8 SWMU 15-Pesticide Waste Trench (No Further Action)

5.7.8.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 15; therefore, the site is recommended for no further action. Table 5-37 summarizes the F&T and risk data for SWMU 15. Figure B-37 shows sampling locations and analytical results from SWMU 15.

Site Characteristics

Past Site Activities

- The site is located on the southern end of DDJC-Tracy, just east of Building 30. Consolidated Subsistence Facility.
- The site was a pesticide waste trench from approximately 1977 until late 1978 or early 1979.
- Rodent bait, crushed cans that previously contained pesticides, or phosgene (phostoxin) slurry may have been buried in the trench.
- Empty DDT containers may have been disposed of in this trench.
- Between 1979 and 1980 the trench was excavated and its contents were disposed of off-site.
- Two underground water lines run through the middle of the former trench.
- The area is currently unpaved.

RI/FS Activities

- Site investigation activities included a geophysical survey, soil-gas surveys, soil sampling, well installation, and groundwater monitoring.
- An F&T analysis, a WQSA, and a BRA were performed for SWMU 15. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-37. Summary of Fate and Transport and Risk Data for SWMU 15

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	< 1x10 -6 depot worker	< 1 depot worker	None

<IMG SRC 98030M>

5.7.9 SWMU 16-Possible Waste Disposal Area (No Further Action)

5.7.9.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 16; therefore, the site is recommended for no further action. Groundwater SWMU 16 beneath this site is located in the vicinity of known OU 1 groundwater contamination. However, SWMU 16 is not the source of this contamination. Table 5-38 summarizes the F&T and risk data for SWMU 16. Figure B-38 shows sampling locations and analytical results from SWMU 16.

Site Characteristics

Past Site Activities

- The site is located on the northern portion of DDJC-Tracy, just south of Building 26.
- The site was possibly a waste disposal area that operated between 1952 and 1967.
- Reportedly, the following items may have been buried at this site: asbestos; mercury; fluorescent bulbs; and medical supplies containing narcotics, mercury, and phosphate compounds.
- The area is currently unpaved and unused.

RI/FS Activities

- Site investigation activities include a geophysical survey, soil-gas surveys, soil sampling, well installation, and groundwater monitoring.
- An F&T analysis, a WQSA, and a BRA were performed for SWMU 16. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 16

Impacted Medium	Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	None	None	< 1x10 -6 construction worker	< 1 construction worker	None

<IMG SRC 98030MA>

5.7.10 SWMU 21-Battery Acid Dump (No Further Action)

5.7.10.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 21; therefore, the 1 site is recommended for no further action, Groundwater beneath this site is within the vicinity of OU 1 groundwater contamination: however, the source of this contamination in the groundwater is not SWMU 21. Table 5-39 summarizes the F&T and risk data for SWMU 21. Figure B-39 shows sampling locations and analytical results from SWMU 21.

Site Characteristics

Past Site Activities

- The site is located on the northern portion of DDJC-Tracy, just west of Building 201.
- The site was a battery acid dump area.
- The neutralized solution from the battery shop waste was discharged onto the ground and later into a sump behind Building 201 and allowed to evaporate or seep into the ground.
- The area surrounding SVWU 21 is paved with asphalt.

RI/FS Activities

- Site investigation activities included a soil-gas survey, soil sampling, groundwater sampling from a HydroPunch device (HP29), and groundwater monitoring.

- An F&T analysis, a WQSA, and a BRA were performed for SWMU 21. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 21

Impacted Medium	Threat to Beneficial Uses Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
Soil	None	None	$<1x10^{-6}$ depot worker	<1 depot worker	None

<IMG SRC 98030MB>

5.7.11 SWMU 22-Previous Hazardous Materials Storage Area (No Further Action)

5.7.11.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 22. therefore, the site is recommended for no further action. Table 5-40 summarizes the F&T and risk data for SWMU 22. Figure B-40 shows sampling locations and analytical results from SWMU 22.

Site Characteristics

Past Site Activities

- The site is located east of Building 22 in the eastern portion of DDJC-Tracy.

- The site was the previous location for hazardous materials storage for DDJC-Tracy from 1979 until 1985.

- The site was used for storing leaking containers of hazardous materials prior to off-site disposal or repackaging in Building 28.

- The holding area was lined with bentonite (clay).

- Aerial photographs show drums in the areas that were labeled as ammonium thiosulfate.

- The area is unpaved.

RI/FS Activities

- Site investigation activities included a geophysical survey, soil-gas surveys, soil sampling, well installation, and groundwater monitoring.

- An F&T analysis, a WQSA, and a BRA were performed for SWMU 22. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 22

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	$< 1x10^{-6}$ construction worker	< 1 construction worker	None

<IMG SRC 98030MC>

5.7.12 SWMU 23-Building 26 Recoup Operations (No Further Action)

5.7.12.1 Volatile organic compound (PCE, TCE) formerly impacted groundwater at SWMU 23. No continuing threats to groundwater, human health, or ecological receptors were identified at the site. Table 5-41 summarizes the fate and transport and risk data for SWMU 23.

Site Characteristics

Past Site Activities

- SWMU 23 includes Building 26 and was used for repackaging petroleum products, including oils, solvents, and ethylene glycol.

- The site was originally a wash rack constructed in 1950.

- A small floor drain in Building 126 was reportedly connected to the industrial wastewater system via SWMU 33.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 23

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 construction worker	<1 construction worker	None

<IMG SRC 98030MD>

5.7.13 SWMU 25-Boundary Roads (No Further Action)

5.7.13.1 Soil has not been adversely impacted by past activities at SWMU 25; therefore, the site is recommended for no further action. Table 5-42 summarizes the F&T and risk data for SWMU 25. Figure B-41 shows sampling locations and analytical results for SWMU 25.

Site Characteristics

Past Site Activities

- This site includes the boundary roads of DDJC-Tracy.

- Waste motor oil may have been used as a dust suppressant on the boundary roads in the 1940s and 1950s.

- Most of the roads are currently paved. The unpaved portions located along the southern depot boundary were investigated during the Phase I RI. The unpaved portions are coated with a bituminous (oil and gravel) surface.

RI/FS Activities

- Site investigation activities included soil sampling.

- An F&T analysis, a WQSA, and a BRA were performed for SWMU 25. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 25

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	$<1x10^{-6}$ depot worker	<1 depot worker	None

<IMG SRC 98030ME>

5.7.14 SWMU 29-Used Motor Oil Pit (No Further Action)

5.7.14.1 No evidence of disposal activities has been identified; therefore, the site is recommended for no further action. Table 5-43 summarizes the F&T risk data for SWMU 29. Figure B-42 shows sampling locations and analytical results from SWMU 29.

Site Characteristics

Past Site Activities

- The site is located north of Building 225 and west of SWMU 2 in the northern portion of DDJC-Tracy. The actual location is uncertain.
- The site is a former used motor oil disposal pit.
- The period of operation is uncertain.
- The area in the immediate vicinity of the site has been extensively excavated for underground utilities and is currently covered with asphalt.

RI/FS Activities

- Site investigation activities included a geophysical survey and soil-gas surveys.
- Because there was no evidence of disposal activities at SWMU 29, no F&T analysis, WQSA, or BRA was conducted.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 29

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	$<1x10^{-6}$ depot worker	<1 depot worker	None

<IMG SRC 98030MF>

5.7.15 SWMU 30-Salvage Area (No Further Action)

5.7.15.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 30; therefore, the site is recommended for no further action. SWMU 30 is located within the area of the known OU 1 plume; however, the source of contamination is not SWMU 30. Table 5-44 summarizes the F&T and risk data for SWMU 30. Figures B-43 and B-44 show sampling locations and analytical results from SWMU 30.

Site Characteristics

Past Site Activities

- The site is located south of Building 22 in the eastern portion of DDJC-Tracy.

- The site is a former salvage area.
- No information is available on the history or type of waste disposal practices in this area.
- The area in the immediate vicinity of the site is unpaved.

RI/FS Activities

- Site investigation activities included soil-gas sampling, soil sampling, and groundwater monitoring from various wells.
- An F&T analysis, a WQSA, and a BRA were performed for SWMU 30. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 30

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	$<1\times10^{-6}$ depot worker	<1 depot worker	None

<IMG SRC 98030MG>

5.7.16 SWMU 31-Wood Preservation Area (No Further Action)

5.7.16.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 31; therefore, the site is recommended for no further action. SWMU 31 is located within the area of the known OU 1 groundwater contamination, but is not considered a potential source area. Table 5-45 summarizes the F&T and risk data for SWMU 31. Figure B-45 shows the sampling locations and analytical results from SWMU 31.

Site Characteristics

Past Site Activities

- The site is located east of Building 247.
- The site was used for wood preservation operations from the mid- 1950s until 1960.
- Wood products, primarily pallets, were reportedly dipped into large vats containing phenolic compounds and carbolic acid to prevent the wood from rotting.
- The vats sat in the open and were covered with canvas tarps. Liquid was reportedly spilled from the vats during operation.
- The area in the immediate vicinity is paved.

RI/FS Activities

- Site investigation activities included soil sampling and groundwater monitoring.
- An F&T analysis, a WQSA, and a BRA were performed for SWMU 31. Summaries of the WQSA and the BRA are presented in Section 6.0.

Table 5-36. Summary of Fate and Transport and Risk Data for SWMU 31

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 depot worker	<1 depot worker	None

<IMG SRC 98030MH>

5.7.17 SWMU 64-Waste Oil Pit (No Further Action)

5.7.17.1 Soil and groundwater have not been adversely impacted by past activities at SWMU 64; therefore, the site is recommended for no further action. SWMU 64 is located on the upgadient edge of the known area of OU 1 groundwater contamination, but is not considered a potential source. Table 5-46 summarizes the F&T and risk data for SWMU 64. Figure B-46 shows the sampling locations and analytical results from SWMU 64.

Site Characteristics

Past Site Activities

- The site is located on the northern side of Building 201.
- This site included a 1,000-gallon metal tank that contained waste oils generated by the automotive maintenance shop in Building 201.
- Waste oils were stored in the tank temporarily, pending off-site disposal.
- The tank was installed in 1975 and removed in 1988.
- The excavated area is covered with asphalt, and the area in the immediate vicinity of SWMU 64 is covered with concrete.

RI/FS Activities

- Site investigation activities included soil sampling, well installation, and groundwater monitoring.
- An F&T analysis and a BRA were performed for SWMU 64. A WQSA was not performed for SWMU 64 because only a few samples (metals) exceeded background concentrations and then only marginally. A summary of the BRA is presented in Section 6.0.

Table 5-46. Summary of Fate and Transport and Risk Data for SWMU 64

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 depot worker	<1 depot worker	None

<IMG SRC 98030MI>

5.7.18 Area 1 Building 236 (No Further Action)

5.7.18.1 Soil has not been adversely impacted by the past activities at this site; therefore, the site is recommended for no further action. Area 1 Building 236 is located within the known area of OU 1 groundwater contamination, but is not considered a potential source of the contamination. Table 5-47 summarizes the F&T and risk data for Area 1 Building 236. Figure B-47 shows the sampling locations and analytical results from Area 1 Building 236.

Site Characteristics

Past Site Activities

- The site is located in the northern portion of DDJC-Tracy in the central shops and maintenance area directly east of Building 236.

- Solvents have historically been used or stored in this area.

- The area is covered with asphalt.

RI/FS Activities

- Site investigation activities included soil sampling.

- A BRA was performed for Area 1 Building 236. A WQSA was not performed because the methylene chloride detected in the soil was determined to probably be the result of laboratory contamination. A summary of the BRA is presented in Section 6.0.

Table 5-47. Summary of Fate and Transport and Risk Data for Area 1 Building 236

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	$<1\times10^{-6}$ depot worker	<1 depot worker	None

<IMG SRC 98030MJ>

5.7.19 Building 15 Drum Storage Area (No Further Action)

5.7.19.1 Soil has not been adversely impacted by past activities at the Building 15 Drum Storage Area; therefore, the site is recommended for no further action. Table 5-48 summarizes the F&T and risk data for the Building 15 Drum Storage Area. Figure B-48 shows the sampling locations and analytical results from the Building 15 Drum Storage Area.

Site Characteristics

Past Site Activities

- The site is located in the central portion of DDJC-Tracy between A and B Streets.

- The site includes a concrete slab on which various materials are currently stored.

- Solvents were stored at drum storage areas at DDJC-Tracy.

- Site history indicates that petroleum hydrocarbons or wastes containing metals were stored at this site.

- Infiltration galleries for the OU 1 IRM system were recently constructed at the site.

- The site is not near other RI sites.

RI/FS Activities

- Site investigation activities included soil sampling.

- Because no contaminants of potential concern were identified, the F&T analysis, the WQSA, and the BRA were not conducted for the Building 15 Drum Storage Area.

Table 5-48. Summary of Fate and Transport and Risk Data for Building 15 Drum Storage Area

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 depot worker	<1 depot worker worker	None

<IMG SRC 98030MK>

5.7.20 Building 22 Drum Storage Area (No Further Action)

5.7.20.1 Soil and groundwater have not been adversely impacted by past activities at the Building 22 Drum Storage Area; therefore, the site is recommended for no further action. Table 5-49 summarizes the F&T and risk data for the Building 22 Drum Storage Area. Figure B-49 shows the sampling locations and analytical results from the Building 22 Drum Storage Area.

Site Characteristics

Past Site Activities

- The site is located on the eastern edge of DDJC-Tracy at the easternmost end of B Street.
- The site includes a paved area on which pallets of materials are currently stored.
- Solvents were stored at drum storage areas at DDJC-Tracy.
- The area is paved with asphalt.

RI/FS Activities

- Site investigation activities included soil sampling and groundwater monitoring.
- An F&T analysis and a BRA were performed for the Building 22 Drum Storage Area. A WQSA was not performed because the Phase I RI activities indicated that there has not been a release of contaminants from the Building 22 Drum Storage Area. A summary of the BRA is presented in Section 6.0.

Table 5-49. Summary of Fate and Transport and Risk Data for Building 22 Drum Storage Area

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 depot worker	<1 depot worker	None

<IMG SRC 98030ML>

5.7.21 Building 23 (No Further Action)

5.7.21.1 Soil has not been adversely impacted by past activities at this site; therefore, the site is recommended for no further action. Table 5-50 summarizes the F&T and risk data for Building 23. Figure B-50 shows the sampling locations and analytical results from Building 23.

Site Characteristics

Past Site Activities

- The site is located in the central portion of DDJC-Tracy, between B and C Streets. The site is to the east of Building 23 and adjacent to a number of open storage areas.

- This site is within a larger area identified in previous investigations as being an area containing potential soil contamination.

- The area in the immediate vicinity of Building 23 is covered with asphalt.

RI/FS Activities

- Site investigation activities included soil-gas surveys and soil sampling.

- Neither an F&T analysis nor a WQSA was conducted for Building 23 because no chemicals of potential concern were identified. A BRA was performed. A summary of the BRA is presented in Section 6.0.

Table 5-50. Summary of Fate and Transport and Risk Data for Building 23

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 depot worker	<1 depot worker	None

<IMG SRC 98030MM>

5.8 Day Care Center (Excavation and Disposal-Time Critical Removal Action)

5.8.1 Soil contaminated with SVOCs (PAHs), pesticides, and metals was removed in October 1995. No threat to groundwater or risks to children remain. Table 5-51 summarizes the F&T and risk data for the Day Care Center. Figure B-51 shows the sampling locations and analytical results from the Day Care Center.

Site Characteristics

Past Site Activities

- The site is located on the west side of the depot, north of and adjacent to the main depot entrance on Chrisman Road.

- A 1,200-gallon metal UST containing No. 2 fuel oil was located at this site.

- The UST was installed prior to 1956 and removed in 1988.

- All soil in the lawn area was removed to a depth of 1 foot and replaced with 3 inches of clean soil over 9 inches of clean fill.

RI/FS Activities

- Site investigation activities included soil sampling and groundwater sampling from a HydroPunch (PH002).

- An F&T analysis and a BRA were performed for the Day Care Center. A WQSA was not performed because metals and pesticide concentrations at the Day Care Center only slightly exceeded background levels. A summary of the BRA is presented in Section 6.0.

Table 5-51. Summary of Fate and Transport and Risk Data for Day Care Center

Threat to Beneficial Uses of Groundwater	Threat to Background Groundwater Quality	Cancer Risk	Hazard Index	Ecological Risks
None	None	<1x10 -6 a children	<1 a children	None

a After remedial activity was complete in October 1995. Prior to remedial activity cancer risk was> 1x10 -6 and hazard index was > 1.0 for children. The increased incremental cancer risk following the action at the Day Care Center is zero.

<IMG SRC 98030MN>
<IMG SRC 98030MO>
<IMG SRC 98030MP>

6.0 SUMMARY OF SITE RISKS

A baseline risk assessment (BRA) was conducted at Defense Depot San Joaquin (DDJC)-Tracy (Montgomery Watson, 1996f). The BRA was conducted to determine if remedial action is required given the potential risks to humans, plants, and animals at DDJC-Tracy. Risks that could exist if no action is taken at DDJC-Tracy were estimated in the BRA. In addition to identifying potential risks to human health and ecological receptors, the Comprehensive RT/FS (Montgomery Watson, 1996a) also identified threats to background groundwater quality and beneficial uses (these threats do not necessarily pose unacceptable risk to human health). The protection of water quality, the protection of human health, and the protection of ecological receptors were the major criteria for determining contaminants of concern and whether sites required remediation.

6.1 BRA Methodology

6.1.1 Because DDJC-Tracy is a Superfund site, the BRA was conducted using methods from the United States Environmental Protection Agency (U.S. EPA) Risk Assessment Guidance for Superfund (U.S. EPA, 1989a and b; U.S. EPA, 1991a and b). Other applicable supplements were used, including relevant regional U.S. EPA (Region IX) and state risk assessment guidance (Department of Toxic Substances Control [DTSC], 1992). The BRA used a conservative and protective approach that included the following five components:

1. Identification of chemicals of potential concern (COPCs) (also known as hazard identification);

2. Exposure assessment, including identifying and characterizing the exposure pathways, and estimating chemical intakes;

3. Toxicity assessment of the COPCs;

4. Risk characterization; and

5. Development of cleanup criteria

6.1.2 The BRA grouped the solid waste management units (SWMUs), the underground storage tanks (USTs), and soil contamination areas at DDJC-Tracy into 15 exposure units (EUs) based on location and similarities in contaminants and pathways. The Tracy Annex, OU 1, and property north of the depot were evaluated as three separate EUs to evaluate groundwater impacts. It is reasonable to evaluate risks for groups of source areas (Eus) rather than for individual sources because the sources are close together and receptors may be exposed to contaminants from multiple sources. The potential for risks from separate EUs to combine and create a larger risk than the sum of the risks of the individual EUs was considered in an analysis of site-wide risk. A list of the Eus and associated sites is presented in Table 6-1.

6.2 Identification of COPCs for Humans

The chemicals that were present at a site at levels above background threshold concentrations but not considered essential nutrients (i.e., the metals sodium, potassium, magnesium, calcium, and iron) were identified as COPCs. If a chemical was present above the relevant background threshold in at least one sample within an EU, that compound was evaluated as a COPC for that EU. The COPCs were evaluated in the toxicity assessment (see Section 6.4) to identify the chemicals of concern (COCs) that require remediation to protect human health (see Section 6.5).

6.2.1 Current and Future Land Use

Current and future land use at DDJC-Tracy was examined as part of the risk evaluation. DDJC-Tracy is primarily a storage and distribution facility for various supplies in common use by the U.S. military services in the western U.S. and throughout the Pacific. In addition, the depot has residential buildings and a day care center, all of which add potential receptors to the exposure assessment. The site is also used to train grader operators. The land use surrounding DDJC-Tracy and the Tracy Annex is primarily agricultural, consisting of irrigated row crops and orchards. Numerous rural residential developments exist within a 3-mile radius, including small areas of commercial and industrial land use. The land use at DDJC-Tracy and in the region surrounding the site is expected to remain the same for the foreseeable future; however, construction may occur on site or in nearby areas. No known Defense Logistics Agency plan exists to sell or change the current use of the DDJC-Tracy operations area.

6.2.2 COPCs and Media of Concern

The COPCs, at DDJC-Tracy include volatile organic compounds (VOCs), semivolatile organic compounds, herbicides, PCBs, petroleum hydrocarbons, metals, and pesticides. These COPCs exist in surface soil/sediment (0 to 9 inches depth), near-surface soil/sediment (0 to 10 feet depth), surface water, and groundwater.

6.3 Human Exposure Assessment

The exposure assessment included identifying the following:

- The populations or subpopulations (e.g., children) that may be exposed to COPCs;
- The exposure pathways (i.e., how the COPCs could reach sensitive populations); and
- The magnitude of exposure for these populations (i.e., the amount of a COPC a population could be exposed to).
- An exposure pathway is complete only if all four of the following elements are present:
- A COPC must be present in the environment;
- The COPC must have a way to be transported through the environment (i.e., through soil, water, or air);
- Humans must be exposed to the COPC; and
- A potential human exposure route (e.g., inhalation and ingestion) must exist at the point of exposure.

6.3.1 Human Receptors and Exposure Pathways

Human receptors evaluated in the BRA include depot workers, visitors, children attending the on-depot day care center, local residents, agricultural workers, potential future on-depot residents, construction workers, and grader operators who train at DDJC-Tracy. ("On-depot" refers to the activities occurring within the operating portion of DDJC-Tracy.) The environmental transport media that act as pathways for exposure include groundwater, soil, sediment, and surface water. Table 6-2 summarizes the existing pathways for exposure and Table 6-3 summarizes potential future pathways for exposure.

6.3.2 Exposure Concentrations

Evaluating exposure requires the assessment of an exposure point concentration, or the COPC concentration that someone may contact. For this assessment, the exposure point concentration was either the 95% Upper Confidence Limit (UCL) of the mean, or the maximum concentration detected, whichever was highest. All analytical data from the sampling effort were used in calculating exposure point concentrations. A concentration equal to one-half the detection limit was used when chemicals were not detected.

6.3.3 Assumptions Used to Calculate Chemical Exposure

Exposure was estimated in units of milligrams of chemical per kilogram of body weight per day (mg/kg-day). For example, the milligrams of a chemical entering the body could be calculated as a water ingestion rate multiplied by the chemical concentration in the water, or an air inhalation rate multiplied by the chemical concentration in the air. The exposure doses were estimated using values for input parameters that were consentative and likely to overestimate exposure.

6.4 Human Toxicity Assessment Associated with COPCs

6.4.1 The toxicity assessment describes the potential harmful effects associated with exposure to COPCs. Three different methods were used to quantify the toxicity of the COPCs.

6.4.2 Noncarcinogenic effects are characterized by a reference dose (RfD) which is a threshold below which no effects occur. The U.S. EPA establishes reference doses for ingestion and inhalation routes (dermal toxicity is based on the oral RfD) with a margin of safety for sensitive individuals. Reference doses are derived from human epidemiological studies or chronic animal studies from which extrapolations are made to humans using uncertainty factors. The uncertainty factor helps to ensure that the extrapolation of experimental data does not underestimate the potential for noncarcinogenic effects to occur.

6.4.3 Carcinogens are classified into groups A through E by U.S. EPA based on what the weight of evidence says about the chemical causing human cancer. Carcinogenicity is quantified with a slope factor (SF), or the cancer risk per unit daily intake of the chemical, expressed in units of mg/kg-day. The SF represents the upper 95% confidence interval of the slope of the dose-response curve. The SF times the exposure dose equals the upper-bound estimate of the risk of developing cancer from exposure to the compound of interest. "Upper-bound" refers to a conservative estimate of the risks that is calculated from the cancer SF to ensure that actual cancer risks are not under-estimated. As in the reference dose, uncertainty factors allow for the extrapolation of chronic animal studies to humans. For this risk assessment, the risks from multiple COPCs were assumed to be additive; neither synergistic nor antagonistic effects were considered.

6.4.4 The potential concentration of lead in blood was used to characterize the health risks caused by exposure to lead. The Cal-EPA Lead Toxicity Model (Leadspread) was used to estimate the blood-lead levels associated with lead concentrations in soil. A blood-lead level (from intakes of all sources) of as low as 10 micrograms per deciliter (Ig/dl) has been shown to decrease attention spans and reduce intelligence quotients in children. According to the model, blood lead concentrations remained below 10 Ig/L when lead concentrations in the soil were below 130 mg/kg (based on the 95% UCL). Therefore, lead concentrations in the soil of less than 130 mg/kg were eliminated from evaluation by the model and assumed to be harmless.

6.4.5 A summary of the toxicological properties, potential health effects, and the toxicity criteria values of the COPCs is included in the risk assessment (Montgomery Watson, 1996d).

6.5 Human Risk Characterization

6.5.1 Risk characterization integrates and summarizes the toxicity and exposure assessment information. The results of risk characterization are carcinogenic and noncarcinogenic quantitative risk estimates for each medium for each pathway.

6.5.2 Risks for noncancer effects were quantified as a hazard index (HI), the ratio of the exposure dose to the reference dose. If the sum of the HIs for all noncarcinogens is less than 1.0, then no chronic health effects are expected. If the HI is greater than 1.0, adverse health effects are possible. There is some latitude in these conclusions depending on the potential for underestimating or overestimating the exposure dose.

6.5.3 For carcinogens, risk estimates are the incremental probability that an individual will develop cancer over a lifetime as a result of exposure to a particular carcinogen or set of carcinogens, that is, the excess lifetime cancer risks (U.S. EPA, 1989a). According to the revised National Contingency Plan (NCP) (U.S. EPA, 1990b), carcinogenic risks from exposures at a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site are in a potentially acceptable range if they are between 1x10 -4 and 1x10 -6. It is generally accepted that risks above this range require attention, and risks below this range do not require attention.

6.5.4 There is little potential for the depot to become a residential development in the foreseeable future. Potential future residents were evaluated solely to provide benchmarks for evaluating receptors with lower potential risk and to fully inform the depot about suitable uses for different parcels of land.

6.5.5 Summaries of the results of the baseline human health risk assessment are shown in Table 6-4 (for current receptors) and Table 6-5 (for potential future receptors). Risks to potential future residents on the depot and annex are summarized in the tables, but were not considered in determining whether remediation is required. Under existing conditions, these are not considered to be potentially completed pathways. If the use of the depot unexpectedly changes, it will be necessary to reevaluate the selected remedies for any area designated for residential use.

6.5.6 EUs 8, 10, and 11 consist of multiple sites and, therefore, required additional analysis to identify risks on a site-by-site basis. For EU 11, the HI for depot and construction workers was less than 1 and the cancer risk was less than 1x10 -6; therefore, no remediation was required for this EU (Montgomery Watson, 1997b).

6.5.7 At EU 8, the cancer risk to the depot worker from ingestion, inhalation, and dermal contact with surface soils was estimated at 3x10 -4. SWMU 27/Area 1 was the only site within EU 8 where surface soil samples were collected and analyzed (no concerns at other sites were identified in the work plan) so the cancer risk to the current depot worker is attributed to this site (Montgomery Watson, 1997b). The surface and near-surface soil exposure scenario for the depot worker and the risk to a future construction worker are summarized in Table 6-6. The exceedances are associated with SWMU 27/Area 1 Building 206 and with Area 1 - Building 237. Area 1 - Building 237 is not recommended for remediation because the cancer risk (1.3x10 -6) is associated with arsenic, which is present in concentrations that are considered typical in the western United States (Shacklette and Boerngen, 1984).

6.5.8 At EU 10, the risks to a construction worker from carcinogenic polycyclic aromatic hydrocarbons (PAHs), chlordane, dieldrin, DDD, DDE, DDT, polychlorinated biphenyls (PCBs), dioxins/furans, aluminum, antimony, barium, beryllium, and manganese account for 99% of the total cancer risk and 99.2% of the hazard index (Montgomery Watson, 1997b). The risk for each of these chemicals was evaluated at each of the sites and is summarized in Table 6-7. Exceedances of the benchmark level were calculated at SWMUs 7, 8, and 30. At SWMUs 7 and 24, the hazard index was estimated at 9 and is associated with manganese. The concentrations of manganese are typical of those throughout the western United States (Shacklette and Boerngen, 1984). Manganese concentrations in the west range from <300 to 5,000 mg/kg. At SWMU 30, the cancer risk of 1.3x10 -6 was associated with beryllium. The concentrations of beryllium were within the normal range for beryllium in the western United States (Shacklette and Boerngen, 1984), and SWMU 30 is not considered to require remediation. Beryllium concentrations in the west range from <1 to 15 mg/kg.

6.5.9 Seven of the sites were identified as requiring remediation to reduce the increased lifetime cancer risk (ILCR) to no greater than 1x10 -6 and the hazard index to less than 1.0 for current and likely potential future receptors (off-depot residents, grader operators, day care center children, depot workers, and construction workers). These sites include:

- EU 1 (the on-depot groundwater portion of OU 1) has dieldrin and VOCs in concentrations that could present a potential, but unlikely risk to depot workers if a well were installed into the contaminant plume;

- EU 3 (the off-depot groundwater portion of OU 1) has trichloroethene (TCE) that presents risks to potential future annex residents, who could be exposed through ingestion or inhalation;

- SWMU 24 at EU 9 presents potential future risks if a building with poor ventilation is located on top of the area with the highest concentrations of COPCs;

- SWMU 8 at EU 10 presents potential future risks to construction workers who may be exposed to organochlorine pesticides in the soils;

- SWMUs 2 and 3 (EUs 4 and 5) present potential risks to depot workers who may be exposed to pesticides;

- Near surface soils in the northern corner of the depot (EU 8) present potential future risks to grader operators; and

- SWMU 27 in EU 8 presents potential risks to depot workers if the foundation of Building 206 is removed. PAHs and PCBs are present in the soils underneath this foundation.

6.5.10 The cancer risk for a depot worker exposed to constituents (primarily polyaromatic hydrocarbons, or PAHs) in surface soil at SWMU 1/Area 2 was estimated to equal 1x10 -5. This risk, while above the point of departure of 1x10 -6, is within the potentially acceptable range of 1x10 -6 to 1x10 -4. Therefore, additional factors need to be examined to determine whether remediation of PAHs is appropriate for this site.

6.5.11 One of the factors is the potential for exposure to occur. There is a degraded asphalt pavement/compacted layer at the surface of this area, and the risk assessment considered all samples above 3.5 feet bgs as surface samples when calculating worker risks. The shallowest depth at which PAHs were detected was 2.0 feet bgs (PAHs were the chemicals responsible for most of the risk). However, workers typically only come in contact with the top few inches of soil. Consequently, unless the workers excavate down two feet, there will not be a complete pathway between the workers and the PAHs at this site. The potential for workers to be exposed to PAHs at this site is considered low.

6.5.12 It should also be noted that the concentrations of carcinogenic PAHs at SWMU 1/Area 2 are typical of what people are exposed to in their everyday lives. The average total concentration of carcinogenic PAHs from surface soil samples at SWMU 1/Area 2 was 0.3 mg/kg. This compares favorably with the median concentration of 1.1 mg/kg found by Menzie, Potocki, and Santodonato (1992) in urban background soils, and is in the range of 0.01 to 1.01 mg/kg that was found in rural soils. Thus, even if exposure pathways are completed at this site, workers will not be exposed to greater concentrations of PAHs than what people are exposed to on a daily basis in the United States.

6.5.13 In summary, the risks to workers are in an acceptable range; the exposure pathways for which the risks were calculated are unlikely to be completed, and the calculated risks are based on PAH concentrations that are typically encountered in the United States. Consequently, no action is an appropriate risk management decision for PAHs at SWMU 1/Area 2.

6.5.14 The estimated cancer risk for a worker at SWMU 4 was 1x10 -6. This risk represents a de minimis risk. It should also be noted that the greatest risk associated with any individual chemical is only 5x10 -7 . No action is an appropriate risk management decision with respect to human health risks at this site.

6.5.15 Cancer risks at the Day Care Center were previously estimated at 1x10 -5 . The contaminated soil was removed from this site as a time-critical removal action. The fill material brought in to the Day Care Center had no detectable concentrations of volatile organics, semivolatile organics, pesticides, PCBs, or petroleum hydrocarbons. All metals detected were either below the EPA Region IX preliminary remediation goal (PRG) for residential soil or well below the background threshold level for the site. The incremental risk associated with soils remaining at the Day Care Center was reduced to zero. No other areas within DDJC-Tracy, as analyzed individually or as part of the site-wide risk, required remediation to protect human health. Table 6-8 identifies the CoCs that require remediation and the concentrations that are protective of human health.

6.6 Ecological Risk Assessment

6.6.1 Background

6.6.1.1 The ecological risk assessment (ERA) evaluated the actual or potential effects of a site on plants and animals. The objective of the ERA was to estimate the chemical risks to wildlife on a site for those areas where wildlife habitat currently exists and contamination has been documented. DDJC-Tracy contains very few areas suitable for wildlife habitat because of the industrial/commercial land use at the facility. Approximately 75% of the depot is covered with buildings, roadways, and paved parking areas. No known rare or endangered species of wildlife have been documented at the depot. The depot is within the historic range of the San Joaquin kit fox (endangered), the giant garter snake (threatened), Swainsons hawk (threatened), the western yellow-billed cuckoo (threatened), and the valley elderberry longhorn beetle (threatened). However, none of these species has been sited during site visits. No critical habitats or habitats of endangered species have been identified. There are no sensitive habitats, such as natural high quality wetlands, or aquatic or terrestrial natural areas that provide habitat for wildlife species on site. However, three on-site areas, though they are man-made, can provide habitat to wildlife. The three areas are:

- Depot-wide surface soil;
- Surface water and sediment in the SWMU 2 sewage lagoons, referred to as EU 4 in the BRA (Montgomery Watson, 1996d); and
- Surface water and sediment in the SWMU 4 storm drain lagoon, referred to as EU 6 in the human health risk assessment.

6.6.1.2 The approach used for the ERA involves identifying chemicals of potential ecological concern and conducting an exposure assessment, a toxicity assessment, and a risk characterization.

6.6.2 Identification of COPECs

Chemicals of potential ecological concern (COPECs) are compounds that might have been released to the environment through site activities that have the potential to pose a health risk to plants and animals. COPECs are analogous to the COPCs that were identified for their potential impacts to human health. The following criteria were used to screen the list of COPECs:

- The concentration of the COPEC was compared with background levels;
- The toxicity of the COPEC to plants and animals was assessed;
- The frequency of detection of the COPEC in the samples was determined;
- The COPEC was compared with toxicity benchmarks (e.g., Ambient Water Quality Criteria [AWQC]); and
- Professional judgment was used.

6.6.3 Exposure Assessment

6.6.3.1 The exposure assessment for ecological receptors was in many ways similar to the identification of pathways and receptors for human exposures. The assessment included:

- Defining those species or groups of species that exist in each area that could be exposed to the chemically affected media;
- Selecting the receptors of concern for which to assess risks within each area;
- Determining the complete exposure pathways for the selected receptors of concern;
- Selecting the assessment and measurement endpoints for each area; and
- Estimating the level of chemical exposure based on the type of measurement endpoint selected for each receptor of concern for each complete exposure pathway.

6.6.3.2 Assessment endpoints are formal expressions of environmental values to be protected and refer to the characteristics of populations and ecosystems defined over large scales (e.g., maintenance of diverse population). The assessment endpoint for the depot-wide surface soil is to protect the terrestrial habitat at DDJC-Tracy. The assessment endpoint for the industrial and sewage lagoons (SWMUs 2 and 3) and storm drain lagoon (SWMU 4) is to protect avian species that use these habitats regardless of how the lagoons are managed.

6.6.4 Toxicity Assessment

Toxicity values, such as lowest observable effects levels, no observable effects levels, and no observable adverse effects levels were used for the COPECs to define "acceptable" levels of exposure for the receptors of concern.

6.6.5 Risk Characterization

6.6.5.1 The risk characterization integrates the exposure into a quantitative characterization of risk posed by the COPEC to each ecological receptor. Only noncarcinogenic health effects were assessed in the ERA because in the environment the incidence of chemically induced cancer is insignificant.

6.6.5.2 The only chemical risks to ecological receptors at DDJC-Tracy are the adverse effects of the industrial and sewage lagoons (SWMUs 2 and 3) and storm drain lagoon (SWMU 4) on bird species, such as the spotted sandpiper and the great blue heron (storm drain lagoon only). The primary COPECs of concern in the lagoons are DDD, DDT, and DDE (referred to collectively as DDTR) and selenium. The DDTR concentrations may reflect background pesticide use in the area of the depot, rather than use by the depot.

6.6.5.3 Additional monitoring will be performed at SWMUs 2 and 3 to obtain site-specific data that will be used to refine the risk assessment and cleanup standards. The following preliminary concentrations (see Appendix D for calculations) are considered protective of ecological receptors at SWMUs 2 and 3.

Chemical	Concentration Protective of Ecological Receptors (Ig/kg)
Total DDX	241
Lead	28,300
Selenium	616

DDX = DDT + DDE + DDD

6.6.5.4 At SWMU 4, zinc has a hazard index of 70, but this appears to be anomalously high as it is derived from a sediment concentration of 350 mg/kg. This result implies a hazard at a concentration as low as 5 mg/kg, whereas the geometric mean soil concentration in the western United States has been estimated at 55 mg/kg (Shacklette and Boerngen, 1984). Additional monitoring will be performed at SWMU 4 to obtain site-specific data that will be used to refine the risk assessment and cleanup standards. The following concentrations (see Appendix D for calculations) are considered protective of ecological receptors at SWMU 4 (the lead concentration is lower because bioaccumulation has a greater impact on herons).

Chemical	Concentration Protective of Ecological Receptors (pg/kg)
Total DDX	241
Lead	5,130
Selenium	616

DDX = DDT + DDE + DDD

6.6.5.5 Concentrations of ecological receptors were conservatively estimated using literature intake benchmarks. The total DDX concentrations are based on values from Heath et al. 1969 and Anderson et al. 1975. Concentrations of selenium that are protective of ecological receptors based on intake values reported by Heir et al. 1989 and lead concentrations are based on Edens et al. 1976 and Edens and Garlich 1983.

6.7 Evaluation of Threats to Groundwater Quality

6.7.1 If any of the following criteria were met for a constituent, it was suspected of posing a potential threat to groundwater and was included in the initial list of COPCs:

- The constituent was associated with historical practices at the site and was present at the site above the background soil concentration; and

- The constituent has been detected in groundwater;

6.7.2 To evaluate the fate and transport of these COPCs, a phased approach was used to determine the potential future impacts of site contaminants on groundwater. The phased approach consisted of:

1. Screening-level analytical modeling to assess the potential for migration of contaminants in the vadose zone.

2. A water quality site assessment (WQSA) for metals and pesticides to evaluate the potential threat to beneficial uses and background groundwater quality.

3. Equilibrium partitioning of vadose zone contaminants to determine the maximum theoretical concentration in soil water.

4. Approximate one-dimensional modeling in the vadose zone to determine the likely site-specific concentration in soil water.

5. Three-dimensional groundwater flow and contaminant transport modeling to assess the impact of contaminants reaching groundwater at soil-water concentrations in excess of beneficial use limits.

6.7.3 This analysis was applied to all sites with the exception of the following:

- SWMU 11: Wastes previously believed to have been associated with SWMU 11 were instead disposed of at SWMU 10A.

- SWMU 64: Only a few samples marginally exceeded background concentrations for some metals.

- Area 1 Building 236: Methylene chloride was detected at this site, but was determined to be a laboratory contaminant. No other COPCs were identified at the site.

- Day Care Center: Metals and pesticide concentrations only marginally exceeded background concentrations.

6.7.4 The potential for contaminants to migrate through the vadose zone to groundwater was first assessed using an analytical leachate model (ALM). The model was applied to each site to determine which COPCs might migrate downward through the soil to groundwater within a period of 100 years. The constituents that would not reach groundwater within 100 years were determined not to pose a threat to the beneficial uses of groundwater or background groundwater quality and were eliminated from further consideration as COPCs.

6.7.5 A WQSA was also performed on the metals and pesticides at each of the sites to determine the potential for groundwater contamination. Site-specific data, generic factors, and background reference values were used to calculate the relative attenuation required to protect groundwater. Either the Waste Extraction Test was run on the samples with the highest concentrations of pesticides and metals or the extract concentration was back-calculated assuming the reaction of soils extract to total metals concentration was consistent. The extract concentrations were used to determine the attenuation required to protect beneficial uses and background groundwater.

6.7.6 All organic COPCs were further evaluated by equilibrium partitioning analysis (this approach is less effective than the WQSA for metals). The equilibrium partitioning calculations used site-specific maximum concentrations of COPCs in the soil to determine the distribution of contaminants in the soil, the soil water, and the soil gas. The resulting equilibrium-based concentrations were then compared with beneficial-use limits, background threshold values, and practical quantitation limits to determine if the theoretical concentrations were in excess of these values. COPCs with soil-water concentrations less than the applicable background levels were determined not to pose a threat to groundwater and were eliminated from further consideration.

6.7.7 One-dimensional modeling further evaluated the potential impacts of compounds that were detected frequently or had already impacted groundwater. The more exact results of the numerical vadose zone modeling effort replaced the preliminary screening analytical modeling results. Numerical models were also used to evaluate the fate and transport of contaminants in groundwater and the response of the simulated contaminant plumes to the various design alternatives.

6.7.8 The results of the background threshold evaluation, the ALM, the WQSA, the equilibrium partitioning assessment, numerical vadose zone modeling, and three-dimensional groundwater modeling were combined to quantitatively evaluate the overall threat to groundwater quality at each site. Fate and transport modeling was performed at sites identified as having data gaps in the remedial investigation to characterize the lateral and vertical extent of contamination. The results of this assessment for each site are noted in the site characterization summaries in Section 5 and are summarized in Table 6-9 for all COCs.

6.8 Conclusion

Actual or threatened released of hazardous substances from this site, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Table 6-1. Exposure Units, DDJC-Tracy

Exposure Units	SWMUs	USTs	Other Areas of Concern
EU 1			On-depot groundwater (OU 1)
EU 2			Tracy Annex groundwater (OU 1)
EU 3			Off-depot groundwater (OU 1)
EU 4	2		
EU 5	3		
EU 6	4		
EU 7	1		Area 2
EU 8	5,20,21,23,27,29, 31,64	2,3,4,5,6,7,9,10,12,13,14, 15,18,19,22,24,25,26,27,29	Soil Contamination Area 1 - Bldg. 10, Bldg. 206, Bldg. 236, Bldg. 237; Bldg. 15 Drum Storage Area
EU 9	24		
EU 10	6,7,8,9,10,16, 22,30	28,30,32	Soil Contamination Area 3, Bldg. 22 Drum Storage Area
EU 11	10A, 11, 12,14,15	1,11,20,23	Bldg. 30 Drum Storage Area
EU 12		17	Bldg. 23
EU 13	25	17	Bldg. 23
EU 14	33		
EU 15			Day Care Center

EU = Exposure Unit
OU = Operable Unit
SWMU = Solid Waste Management Unit
UST = Underground Storage Tank

<IMG SRC 98030MQ>
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Table 6-4. Summary of Human Health Risks to Current Receptors, DDJC-Tracy

	Cancer Risk Between 1x10 -6 and	<1x10 -6	Hazard Index 1x10 -4	10-4	1	>1
Off-Depot Groundwater (Exposure Unit 3)						
Off-Depot Resident	1x10 -5		0.9			
SWMU 2 - Sewage Lagoons (Exposure Unit 4)						
Depot Worker	2x10 -7		0.003			
SWMU 3 - Industrial Waste Lagoons (Exposure Unit 5)	3x10 -6		0.07			
Depot Worker						
SWMU 4 - Storm Drain Lagoon (Exposure Unit 6)						
Depot Worker	1x10 -6		0.01			
SWMU 1/Area 2 - Old Sewage Lagoon/Drum Storage Area (Exposure Unit 7)			0.07			
Depot Worker	1x10 -5a,b					
Sites in Northern Portion of the Depot (Exposure Unit 8)						
Depot Worker	3x10 -4c		0.9			
SWMU 24 - Building 247 Petroleum Laboratory (Exposure Unit 9)						
Depot Worker - Indoor Air	NA		0.7 a			
Depot Worker - Outdoor Air	NA		0.06			
Sites in the Eastern Portion of the Depot (Exposure to Unit 10)	3xl0 -7		0.005			
Sites in the Southern Portion of the Depot (Exposure Unit 11)	1x10 -8		0.00001			
SWMU 33 - Industrial Waste Pipeline (Exposure Unit 14)	1x10 -8		0.0007			
Day Care Center (Exposure Unit 15)						
Day Care Center Children	1x10 -5d		0.3 d			
Depot-Wide Surface/Near-Surface Soil						
Grader Operator - Eastern	2x10 -7		0.6			
Grader Operator - Southern	4x10 -8		0.3			

Table 6-4. (Continued)

a Risk estimates are for soil contamination that has since been remediated. There is also a hazard index potentially greater than one or a cancer risk potentially greater than 1×10^{-6} from indoor air if a building is constructed directly over the area of greatest contamination.

b The cancer risk is likely between 1×10^{-4} and 1×10^{-6} if polycyclic aromatic hydrocarbons are substantially more carcinogenic via dermal than via oral exposure.

c The cancer risk likely exceeds 1×10^{-4} if polycyclic aromatic hydrocarbons are substantially more carcinogenic via dermal than via oral exposure.

d Risk estimates are for soil contamination that has since been remediated.

NA = Not applicable; no exposure to carcinogens by this receptor.
SWMU = Solid Waste Management Unit

Table 6-5. Summary of Potential Human Health Risks to Future Receptors, DDJC-Tracy, California

	Cancer Risk			Hazard Index	
	$<1\times10^{-6}$	Between 1×10^{-6} and 1×10^{-4}	1×10^{-4}	1	>1
On-Depot Groundwater (Exposure Unit 1)					
Depot Worker			2×10^{-2}		
Exposure Unit 2 (Annex Groundwater)					
Annex Resident c			1×10^{-4}		2
SWMU 2-Sewage Lagoons (Exposure Unit 4)					
On-Depot Residents c		5×10^{-5}			2
SWMU 3-Industrial Lagoons (Exposure Unit 5)					
On-Depot Residents c			4×10^{-4}		10
SWMU 4-Storm Drain Lagoon (Exposure Unit 6)					
On-Depot Residents c		9×10^{-5}			3
Teenage Swimmer c		1×10^{-6}		0.05	
SWMU 1/Area 2-Old Sewage Lagoon/Drum Storage Area (Exposure Unit 7)					
Construction Worker		1×10^{-6}			10
On-Depot Residents c		5×10^{-5}		1	
Sites in Northern Portion of the Depot (Exposure unit 8)					
Construction Worker		5×10^{-6}		0.3	
On-Depot Residents c			2×10^{-4}a	1	
SWMU 24-Building 247 Petroleum Laboratory (Exposure Unit 9)					
Construction Worker		1×10^{-6}			10
On-Depot Residents c		6×10^{-5}			6
Sites in Eastern Portion of the Depot (Exposure unit 10)					
Construction Worker		2×10^{-6}			9
On-Depot Residents c		6×10^{-5}			3
Sites in Southern Portion of the Depot (Exposure Unit 11)					
Construction Worker	9×10^{-7}			0.3	
On-Depot Residents c		2×10^{-5}		0.8	
Building 23 and UST 17 (Exposure Unit 12)					
Construction Worker	1×10^{-9}			0.0003	
On-Depot Residents c	5×10^{-8}			0.001	

Table 6-5. (Continued)

SWMU 33-Industrial Waste Pipeline (Exposure Unit 14)					
Construction Worker	9×10^{-9}			0.2	
On-Depot Residents [c]	4×10^{-7}			0.4	
Day Care Center (Exposure Unit 15)					
On-Depot Residents		3×10^{-5} [b]		0.5 [b]	
Depot-Wide Surface/Near-Surface Soil					
Construction Worker (Grader Operator) - Northern	9×10^{-7}				30
On-Depot Residents - Northern			3×10^{-4}		20
On-Depot Residents - Eastern		9×10^{-5}			2
On-Depot Residents - Southern		2×10^{-5}		0.9	

a The potential cancer risk would likely exceed 1×10^{-4} if polyaromatic hydrocarbons are substantially more carcinogenic via dermal than via oral exposure.
b Risk estimates are for soil contamination that has since been remediated.
c Not considered a potentially completed pathway or used as a basis for remediation.
SWMU = Solid Waste Management Unit
UST = Underground Storage Tank

Table 6-6. Summary of Cancer Risks at EU 8

	Depot Worker Surface Soil	Depot Worker Near-Surface Soil	Construction Worker Surface and Near-Surface Soil
SWMU 5	N/A	0	1.5x10 -7
SWMU 20/23	N/A	2.2x10 -7	0
SWMU 21	N/A	0	0
SWMU 27/Area 1 Bldg. 206	3x10-4	1.7x10 -8	2.1x10 -5
SWMU 29	N/A	0	0
SWMU 31	N/A	0	1.5x10 -7
SWMU 64	N/A	0	0
Area 1 Bldg. 236	N/A	0	0
Area 1 Bldg. 237	N/A	9.6x10 -7	1.3x10 -6
Building 15	N/A	0	0
UST 2	N/A	0	0
UST 3	N/A	0	0
UST 4	N/A	0	0
UST 5	N/A	0	0
UST 6	N/A	0	0
UST 7	N/A	0	0
UST 9	N/A	0	0
UST 10	N/A	0	0
UST 12	N/A	0	0
UST 13	N/A	0	0
UST 14	N/A	1.8x10 -4	0
UST 15	N/A	0	0
UST 18	N/A	0	0
UST 19	N/A	0	0
UST 22	N/A	0	0
UST 24	N/A	0	0
UST 25	N/A	5.6x10 -6	0
UST 26	N/A	0	0
UST 27	N/A	0	0
UST 29	N/A	0	0

Table 6-7. Summary of Risks at EU 10

	Construction Worker	
	Cancer Risk	Hazard Index
SWMU 6	8.8x10 -8	2.7x10 -2
SWMU 7	4.2x10 -7	9.2
SWMU 8	2.7x10 -5	17
SWMU 9	6.0x10 -7	1.0x10 -1
SWMU 10	0	1.0x10 -1
SWMU 16	8.7x10 -7	5.0x10 -3
SWMU 22	8.7x10 -7	1.7x10 -3
SWMU 30	1.3x10 -6	2.5x10 -3
Area 3	0	0
Bldg. 22 DSA	0	0
UST 28	0	0
UST 30	0	0
UST 32	0	0

Table 6-8. COCs That Require Remediation for the Protection of Human Health

Site/COC	Media	Concentration Protective of Human Receptors	Basis	Pathway
OU 1 Groundwater a				
Trichloroethene	Groundwater	5.0 Ig/L	Federal MCL	Inhalation, Ingestion, Dermal Exposure
1,1-Dichloroethene	Groundwater	6.0 Ig/L a	California MCL	Inhalation, Ingestion, Dermal Exposure
Tetrachloroethene	Groundwater	5.0 Ig/L	Federal MCL	Inhalation, Ingestion, Dermal Exposure
Dieldrin	Groundwater	0.05 Ig/L	California Action Level	Inhalation, Ingestion, Dermal Exposure
SWMU 24				
Toluene	Soil	16,000 Ig/L	Risk-based Concentration	Inhalation
SWMU 8				
Total DDX	Soil	30,000 Ig/kg	Risk-based Concentration	Dermal
Dieldrin	Soil	600 Ig/kg	Risk-based Concentration	Ingestion
Near-Surface Soils in Northern Corner of Depot				
Arsenic	Soil	48 Ig/kg	Risk-based Concentration	Inhalation, Ingestion
Manganese	Soil	1,000 Ig/kg	Risk-based Concentration	Inhalation, Ingestion
SWMU 27				
Benzo(a)pyrene	Soil	1,000 Ig/kg	Risk-based Concentration	Dermal, Ingestion
Total PAHs e	Soil	15,000 Ig/kg	Risk-based Concentration	Dermal, Ingestion
PCBs (Arochlor - 1260)	Soil	1,000 Ig/kg	Risk-based Concentration	Dermal, Ingestion

a The estimated ILCR for on-depot workers exposed to MCL concentrations of CoCs is approximately 4x10 -4. Chloroform and 1,1-dichloroethene contribute approximately 75 percent and 18 percent, respectively, to the total risk at MCL concentrations.

DDX = Sum of DDD, DDE, and DDT concentrations
MCL = maximum contaminant level

Table 6-9. Summary of Fate and Transport and Water Quality Site Assessment Results

Site/COC	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	Equilibrium Partitioning Limit Protective of Beneficial Uses a	Equilibrium Partitioning Limit Protective of Background Water Quality b	Model Level c
SWMU 1/Area 2					
VOCs (Ig/kg)					
Tetrachloroethene (PCE)	Yes	Yes	2.4	0.2	14
Trichloroethene (TCE)	Yes	Yes	1.3	0.3	NE
Area 1 Building 237					
VOCs (Ig/kg)					
Tetrachloroethene (PCE)	Yes	Yes	2.4	0.2	15
Area 3					
VOCs (Ig/kg)					
Tetrachloroethene (PCE)	Yes	Yes	2.4	0.2	22
Trichloroethene (TCE)	Yes	Yes	1.3	0.3	32
SWMU 4					
SVOCs (Ig/kg)					
bis(2-Ethylhexyl)phthalate	Yes	Yes	244	122	NR
Fluoranthene	No	Yes	8,023	27	NR
Phenanthrene	Yes	Yes	14	14	NR
Pyrene	No	Yes	5,610	27	NR
Pesticides (Ig/kg)					
Carbaryl	Yes	Yes	24	0.2	NR
Carbofuran	Yes	Yes	4	0.2	NR
Chlordane, total	Yes	Yes	10	10	NR
2,4-D	No	Yes	11	0.02	NR
Dieldrin	Yes	Yes	0.1	0.01	NR
SWMU 6					
Pesticides and Herbicides (Ig/kg)					
Dicamba	Yes	Yes	1.3	0.01	NE
Dieldrin	Yes	Yes	0.1	0.01	3d
Endrin	No	Yes	21	0.1	NE
Heptachlor	Yes	Yes	0.1	0.04	NE
Lindane	Yes	Yes	0.2	<0.01	5
2,4,5-T	No	Yes	14	0.02	NE

SWMU 7					
VOCs (Ig/kg) - Pit F only					
1,2-DCE	Yes	Yes	1.2	0.2	NE
Trichloroethene (TCE)	Yes	Yes	1.3	0.3	NE
SVOCs (Ig/kg) - Pit C only					
bis(2-Ethylhexyl)phthalate	No	Yes	244	122	NR
Pesticides (Ig/kg) - Pit C only					
Dieldrin	Yes	Yes	0.1	0.01	3
Linuron	Yes	Yes	1	0.1	NE
Pesticides and Herbicides (Ig/kg) - Pit D only					
2,4-D	No	Yes	11	0.01	NE
Dieldrin	Yes	Yes	0.1	0.01	3
Linuron	Yes	Yes	1	0.01	3
Simazine	Yes	Yes	1	0.1	NE
Petroleum Hydrocarbons (mg/kg) - Pit D only					
TPH as diesel	Yes	Yes	NE	NE	NE

Table 6-9. (Continued)

Constituent	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	Equilibrium Partitioning Limit Protective of Beneficial Uses a	Equilibrium Partitioning Limit Protective of Background Water Quality b	Model Level c
SWMU 8					
SVOCs (Ig/kg)					
bis(2-Ethylhexyl)phthalate	No	Yes	244	122	NR
Diethylphthalate	No	Yes	1,222	0.2	NE
2,4-Dinitrotoluene	Yes	Yes	9	0.4	NE
Naphthalene	Yes	Yes	21	21	NE
Pesticides and Herbicides (Ig/kg)					
Chlordane, total	Yes	Yes	10	10	NE
2,4-D	Yes	Yes	11	0.02	NE
DDD	Yes	Yes	81	3	NR
DDE	No	No	NA	15	NR
DDT	No	Yes	7	1	NR
DDX, total	NA	NA	NA	NA	NE
Dieldrin	Yes	Yes	0.1	0.01	2
Lindane	Yes	Yes	0.2	0.004	NE
Linuron	Yes	Yes	1	0.1	NE
MCPA	Yes	Yes	1	0.1	NE
Simazine	Yes	Yes	1	0.1	NE
Petroleum Hydrocarbons (mg/kg)					
TPH as gasoline	Yes	Yes	NE	NE	NE
TPH as diesel	Yes	Yes	NE	NE	NE
TPH as motor oil	Yes	Yes	NE	NE	NE
SWMU 20 and Area 1					
VOCs (Ig/kg)					
Trichloroethene (TCE)	Yes	Yes	1.3	0.3	36
Ethylbenzene	No	Yes	653	1	NE
Xylenes	No	Yes	582	0.3	NE
SVOCs (Ig/kg)					
Diethylphthalate	No	Yes	1,222	0.2	NE
2,4-Dinitrophenol	Yes	Yes	11	5	NE
Pentachlorophenol	No	Yes	227	7	NE
2,4,6-Trichlorophenol	Yes	Yes	10	7	NE
Pesticides and Herbicides (Ig/kg)					
Dieldrin	No	Yes	0.1	0.01	27
Methiocarb	Yes	Yes	1	1	NE
MCPA	Yes	Yes	1	0.1	NE
Linuron	Yes	Yes	1	0.1	NE

Petroleum Hydrocarbons (mg/kg)					
TPH as diesel	Yes	Yes	NE	NE	NE
SWMU 24					
VOCs (Ig/kg)					
Acetone	Yes	Yes	89	1	NR
2-Butanone (MEK)	Yes	Yes	30	1	NR
Ethylbenzene	Yes	Yes	653	1	NR
2-Hexanone	Yes	Yes	0.3	1	NR
4-Methyl-1-pentanone (MIBK)	No	Yes	436	1	NR
Toluene	Yes	Yes	56	0.4	NR
Xylenes	Yes	Yes	582	0.3	NR
SVOCs (Ig/kg)					
2,4-Dimethylphenol	Yes	Yes	34	1	NR
Fluoranthene	No	Yes	8,023	3	NR
2-Methylnaphthalene	Yes	Yes	6	6	NR
4-Methylphenol	Yes	Yes	17	1	NR
Naphthalene	Yes	Yes	21	21	NR

Table 6-9. (Continued)

Constituent	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	Equilibrium Partitioning Limit Protective of Beneficial Uses a	Equilibrium Partitioning Limit Protective of Background Water Quality b	Model Level c
SWMU 24 (cont.)					
SVOCs (Ig/kg)					
Phenanthrene	Yes	Yes	14	14	NR
Phenol	Yes	Yes	1	0.3	NR
Pyrene	Yes	Yes	5,610	27	NR
Petroleum Hydrocarbons (mg/kg)					
TPH as gasoline					
TPH as diesel	Yes	Yes	NE	NE	NR
Pesticides and PCBs (Ig/kg)					
PCBs (Aroclor 1260)	Yes	Yes	182	45	NR
Carbofuran	Yes	Yes	4	0.2	NR
Lindane	Yes	Yes	0.2	0.004	NR
Phorate	Yes	Yes	17	2	NR
Ronnel	No	Yes	1,038	1	NR
SWMU 27					
VOCs (Ig/kg)					
Trichloroethene (TCE)	No	Yes	1.3	0.3	36 c
SVOCs (Ig/kg)					
Benzo(a)pyrene	No	No	NA	NA	NE
Total PAHs	No	No	NA	NA	NE
Pesticides, Herbicides, and PCBs (Ig/kg)					
2,4-D	No	Yes	11	0.02	NE
MCPA	Yes	Yes	1	0.1	NE
PCBs (Aroclor 1260)	No	No	NA	NA	NE
2,4,5-T	No	Yes	14	0.02	NE
Petroleum Hydrocarbons (mg/kg)					
TPH as motor oil	Yes	Yes	NE	NE	NE
Building 30 Drum Storage Area					
SVOCs (Ig/kg)					
Benzyl alcohol	No	Yes	1,618	0.3	NE
bis(2-Ethylhexyl)phthalate	Yes	Yes	244	122	NE
Diethylphthalate	No	Yes	1,222	0.2	NE
di-n-Butylphthalate	Yes	Yes	83,401	119	NE

Surface and Near-Surface Soils Northern Depot Area					
Metals (Ig/kg)					
Arsenic	No	No	NA	NA	NE
Manganese	No	No	NA	NA	NE
SWMU 2 and SWMU 3					
SVOCs (Ig/kg)					
bis(2-Ethylhexyl)phthalate	Yes	Yes	244	122	NE
2,4-Dimethylphenol	No	Yes	34	1	NE
di-n-Butylphthalate	No	Yes	83,401	119	NE
4-Methylphenol	Yes	Yes	17	1	NE
Pesticides (Ig/kg)					
Aldrin	Yes	Yes	3	0.3	NE
Chlordane, total	No	Yes	10	10	NR
DDD	No	Yes	81	3	NR
DDE	No	Yes	484	15	NR
DDT	No	Yes	7	1	NR
DDX, total	No	Yes	NA	NA	NR
Dieldrin	Yes	Yes	0.1	0.01	0.1 (11) f
Diuron	Yes	Yes	4	0.1	NE
Endrin	No	Yes	21	0.1	120 (120)

Table 6-9. (Continued)

Constituent	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	Equilibrium Partitioning Limit Protective of Beneficial Uses a	Equilibrium Partitioning Limit Protective of Background Water Quality b	Model Level c
SWMU 2 and SWMU 3 (cont.)					
SVOCs (Ig/kg)					
Lindane (Gamma-BHC)	Yes	Yes	0.2	0.004	NE
Monuron	Yes	Yes	0.04	0.01	NE
2,4-D	No	Yes	11	0.2	NE
Heptachlor epoxide	Yes	Yes	0.004	0.002	NE
SWMU 33					
VOCs (Ig/kg)					
Xylenes	No	Yes	582	0.3	NE
SVOCs (Ig/kg)					
Diethylphthalate	No	Yes	1,222	0.2	NE
di-n-Butylphthalate	No	Yes	83,401	119	NE
Naphthalene	Yes	Yes	21	21	NE
Pesticides (Ig/kg)					
Aldrin	No	Yes	3	0.3	NE
Carbaryl	Yes	Yes	24	0.2	NE
Dieldrin	No	Yes	0.1	0.01	27
Methiocarb	Yes	Yes	1	1	NE
Petroleum Hydrocarbons (mg/kg)					
TPH as diesel	Yes	Yes	NE	NE	NE

a Equilibrium partitioning limit based on comparison of MCLs to soil-water concentrations.

b Equilibrium partitioning limit based on comparison of detection limit to soil-water concentrations.

c Model level derived using vadose zone and groundwater modeling, and based on predicted achievement of MCL in groundwater at the source area.

d Model levels derived using vadose zone and groundwater modeling, and based on predicted achievement of achievement of numerical beneficial use limit in groundwater at the source area.

e Model level extrapolated from Area 1 Bldg. 10, which has similar concentrations and distribution of TCE.

f The value in parentheses represents the dieldrin cleanup level if the soil management cell is constructed at SWMU 3.

NE = not evaluated

NR = not required

NA = not applicable

7.0 DESCRIPTION OF ALTERNATIVES

7.1 General Overview

7.1.1 Applicable or relevant and appropriate requirements (ARARs) and remedial action objectives (RAOs) were developed for each site that requires remedial action at Defense Depot San Joaquin (DDJC)-Tracy. In most cases, the RAOs were location-specific. Cleanup standards, if not already dictated by regulatory requirements, were defined to meet the ARARs and RAOs for each site. Several remedial alternatives were developed and evaluated for each site. ARARs, RAOs, cleanup standards, and remedial alternatives are discussed in the following sections.

7.2 Applicable or Relevant and Appropriate Requirements

7.2.1 Background

7.2.1.1 ARARs are federal and state environmental and facility siting requirements that remedial actions at Superfund sites must comply with. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthotization Act (SARA) of 1986 (collectively, CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) require compliance with ARARs. Only those state requirements that are more stringent than federal ARARs and are legally enforceable and consistently enforced statewide may be ARARs.

7.2.1.2 Pursuant to Section 121 (d) of CERCLA, the on-site portion of a remedial action selected for a Superfund site must comply with all ARARs. In addition to ARARs, guidance documents and other nonpromulgated criteria can be considered in evaluating remedial alternatives. These nonpromulgated guidance or criteria are referred to as criteria or guidelines to be considered (TBCs). For selected remedies, appropriate TBCs are identified as Performance Standards in Section 10.0.

7.2.2 Definition of ARARs and Other Criteria or Guidelines to be Considered

7.2.2.1 An ARAR is an "applicable" or "relevant and appropriate" requirement. According to the NCP (40 CFR Part 300), "applicable requirements," "relevant and appropriate requirements," and "criteria or guidelines TBC" are defined as follows:

7.2.2.2 Applicable Requirements are those cleanup standards, standards of control, or other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified in a timely manner and that are more stringent than federal requirements may be applicable.

7.2.2.3 Relevant and Appropriate Requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and that are more stringent than federal requirements may be relevant and appropriate.

7.2.2.4 Advisories, Criteria, Guidance, or Proposed Standards TBCs consist of nonpromulgated advisories, criteria, or guidance documents that were developed by the U.S. EPA, other federal agencies, or states that may be useful in developing CERCLA remedies. The TBC criteria and guidelines may be used as the agencies deem appropriate.

7.2.3 Identification of ARARs

7.2.3.1 Neither CERCLA nor the NCP provides across-the-board standards for determining whether a particular remedy effects an adequate cleanup at a particular site. Rather, the process recognizes that each site has unique characteristics that must be evaluated and considered against the requirements that apply under the given circumstances. Therefore, the identification of ARARs is done on a site-specific basis.

7.2.3.2 The ARARs are identified and considered at the following points in the remedial process:

- As part of the RI/FS scoping;
- During the site characterization phase of the RI;
- During the development of remedial alternatives;
- During the detailed analysis of the remedial alternatives;
- When an alternative is selected (see Section 10 of this document); and
- During the remedial design.

7.2.3.3 CERCLA actions may have to comply with three different types of ARARs: chemical specific, location specific, and action specific. A detailed analysis of ARARs for the selected remedies is provided in Section 10. The following discussion of ARARs identifies the ARARs used in the development and evaluation of alternatives.

7.2.4 Chemical-Specific ARARs

7.2.4.1 Chemical-specific ARARs are health-or risk-based concentration limits or limits specified by treatment methodologies for various environmental media (i.e., groundwater, surface water, air, soil, and sediment) that are established for a specific chemical that may be present in a specific medium at the site or that may be discharged to the site during remedial activities. The following discussion summarizes the ARARs for each environmental medium of concern at the sites.

7.2.4.2 Soil. California has promulgated standards for the disposal of waste soil under Division 4.5 of Title 22 of the California Code of Regulations (CCR) (22 CCR). Under Title 22, a waste is hazardous if it contains any metals at concentrations exceeding the total threshold limit concentrations (TTLCs). A waste is also hazardous if it contains extractable concentrations exceeding soluble threshold limit concentrations (STLCs). The extractable concentrations are determined by performing the Waste Extraction Test (WET) on samples of the waste soil. The WET is used to determine whether a waste soil is hazardous. If the concentration (in milligrams per liter) of any of the listed metals is greater than the STLC value the waste is hazardous. It is also hazardous if the concentration equals or exceeds the TTLC value. These chemical-specific requirements are ARARs for remedial activities involving the disposal of waste soil. Thus, these ARARs are also action specific.

7.2.4.3 Sediment. No federal or California chemical-specific ARARs have been established for sediment. MCs and STLCs promulgated under Title 22 are action-specific ARARs for the disposal of sediment.

7.2.4.4 Surface Water. The federal Clean Water Act (CWA) requires the establishment of guidelines and standards to control the direct or indirect discharge of pollutants to waters of the United States. Section 303 of the CWA requires each state to develop water quality standards based on federal water quality criteria to protect existing and attainable uses of the receiving waters (U.S. EPA, 1988b). In California, water quality standards are a combination of the designated beneficial uses of water and water quality objectives (numerical or narrative limits) to protect those uses. In California, water quality standards are promulgated by the State and Regional Water Boards in Water Quality Control Plans or "Basin Plans." DDJC-Tracy is included in the Basin Plan for the Central Valley Region-Sacramento River and San Joaquin River Basins (CVRWQCB, 1994).

7.2.4.5 According to California State Water Resources Control Board (SWRCB) Resolution No. 88-63, all surface waters in California are considered to be suitable, or potentially suitable, for municipal or domestic water supply unless exempted. Surface water systems designed or modified to collect or treat storm-water runoff are exempt; thus, municipal and domestic water supplies are not considered beneficial uses for the storm drain lagoon at SWMU 4. The percolation area at SWMU 2 is part of the wastewater treatment system and is also exempt. The lined ponds (SWMU 3) have been removed and incorporated into the percolation area.

7.2.4.6 Groundwater. Drinking water standards (California and Federal) Maximum Contaminant Levels (MCLs) are chemical-specific ARARs for contaminants in groundwater at DDJC-Tracy. Cleanup standards were developed consistent with the MCLs. According to SWRCB Resolution No. 88-63, all groundwater in California is considered suitable, or potentially suitable, for municipal or domestic water supply.

7.2.5 Location-Specific ARARs

7.2.5.1 Federal, state, and regional location-specific ARARs are restrictions placed on the constituent concentration or the activities to be conducted at a site based on the location of the site. Examples of special locations with potential ARARs include flood plains, fault zones, wetlands, historic places, and sensitive ecosystems or habitats. DDJC-Tracy is not located within any floodplains or wetlands; therefore, ARARs specific to these types of locations are not discussed further.

7.2.5.2 National Historic Preservation Act. No buildings or locations at DDJC-Tracy have been or are being considered for the National Registry of Historic Sites (WCC, 1992a). Hence, the National Historic Preservation Act is not a location-specific ARAR for DDJC-Tracy.

7.2.5.3 Federal and California Endangered Species Act. These acts requires that all federal agencies carry out programs for the conservation of listed endangered or threatened wildlife species by ensuring that actions authorized, funded, or carried out by federal agencies are not likely to jeopardize the endangered or threatened species. No known rare or endangered species of wildlife have been documented within the depot. However, the depot is located within the historic range of five sensitive species (see Section 6.6.1). Both statutes require consultation with the Department of the Interior and the California Department of Fish and Game. The Endangered Species Act is a location-specific ARAR for DDJC-Tracy.

7.2.5.4 Aquatic Habitats. The California Fish and Game Code (Division 6, Part 1, Chapter 6) prohibits the deposition of any substance deleterious to fish, plant, or bird life. This code applies to the storm drain lagoon (SWMU 4) located in the northern portion of DDJC-Tracy. Therefore, this code is a location-specific ARAR for DDJC-Tracy.

7.2.6 Action-Specific ARARs

7.2.6.1 Action-specific ARARs are technology- or activity-based requirements or limitations for actions conducted at a site during remediation. Tables 10-2 and 10-3 provide a complete listing of action-specific ARARs. The following subsections summarize the key action-specific ARARs used in the screening of alternatives.

7.2.6.2 Hazardous Waste Management. The Resource Conservation and Recovery Act (RCRA), as codified in 40 CFR 262, 263, and 264, outlines the requirements for the transportation, storage, and disposal of hazardous wastes. The State of California has its own hazardous waste regulations, which are presented in Division 4.5 of Title 22 of the CCR, entitled "Environmental Health Standards for the Management of Hazardous Wastes." Hazardous wastes generated in California must comply with both the California and the federal hazardous waste programs, although the California program is generally more stringent and expansive than the federal program. Some of the wastes that may be handled during remedial activities conducted for DDJC-Tracy may be considered hazardous wastes. The specific requirements that may be ARARs will depend on the types of wastes handled and the specific remedial activities performed at DDJC-Tracy.

7.2.6.3 Title 23, Division 3, Chapter 15 of the CCR and Title 27, Division 2, Subdivision 1 of the CCR outlines ARARs that must be satisfied for investigating, monitoring, and selecting all remedial alternatives for landfills and all other source contaminant sites involving a discharge to land, Activities included in this program are the issuance of waste discharge requirements (WDRs) by the Regional Water Quality Control Board (RWQCB) for the discharge of hazardous, designated, and nonhazardous solid wastes to land and the oversight of corrective actions at leaking waste management units. Articles 2 and 3 cover waste management unit classification, management, and siting. Article 5 covers water quality monitoring and response programs and Articles 8 and 9 cover closure and compliance procedures.

7.2.6.4 Landfarming. RCRA and CCR Title 22 regulations regarding landfarming are applicable to on-site bioremediation for DDJC-Tracy. These regulations require owners of landfarming operations to ensure that no migration of hazardous constituents occurs. Title 27, Division 2, Subdivision 1 of the CCR, which prescribes standards for discharges of wastes to land, stipulates design requirements for landfarming treatment pads. In addition, the San Joaquin County Air Pollution Control District limits the organic content of soils treated with landfarming to below 5,000 mg/kg.

7.2.6.5 Discharge to Surface Water. The CWA regulates the discharge of pollutants into surface water. The National Pollutant Discharge Elimination System (NPDES) provides the permit requirements for a point-discharge into marine or surface waters. The NPDES requirements implemented by the State Water Resources Control Board Order No. 92-08 DWQ (specifically, general permit 5B39SO 13143) are applicable to storm water discharges to the West Side Irrigation District Canal which discharges to Sugar Cut at the Old River. The narrative toxicity water quality objective for inland surface waters, as set forth in the Basin Plan for the Central Valley Region (Cal-EPA CVRWQCB, 1994), apply as an ARAR for SWMU 4.

7.2.6.6 Discharge to Publicly Owned Treatment Works. The general pretreatment regulations for existing and new sources of pollution (40 CFR 403) establish standards for the control of pollutants passing through and interfering with treatment processes in publicly owned treatment works (POTWs). These regulations are not applicable because remedial actions at DDJC-Tracy will not involve the discharge of process water to a POTW.

7.2.6.7 The Clean Air Act. The Clean Air Act (CAA) regulates air emissions; certain titles of the CAA and its amendments are ARARs for CERCLA response actions or technologies. Under Section 110 of the CAA (Title 1), each state has primary responsibility for ensuring air quality within its geographic area. Through the state implementation plan (SIP), the state establishes a program for regulating stationary and mobile sources that maintains and achieves the national ambient air quality standards (NAAQS). SIPs include emission standards, monitoring, record keeping enforcement, and other measures (e.g., economic incentives). The emission standards and monitoring requirements are substantive requirements and are relevant and appropriate for DDJC-Tracy for activities such as dust control, air stripping, and carbon adsorption treatment. The record keeping, enforcement, and other measures are administrative requirements and therefore are not ARARs.

7.2.6.8 New Source Performance Standards. Under Section 111 of the CAA, new source performance standards (NSPS) are defined, as are nationally uniform emission standards for major new stationary sources, particularly for industrial source categories. At present, the NSPS source categories coincide with only a few of the air pollutant emission sources typically found at CERCLA sites. Thus, the NSPS are not usually considered "applicable" to CERCLA activities. However, they may be "relevant and appropriate" to the CERCLA action if the pollutant emitted and the technology employed during the cleanup action are sufficiently similar to the pollutant and source category regulated by an NSPS. For CERCLA municipal landfill remediations (i.e., bioremediation), these requirements would be ARARs after the rule's promulgation. Until these requirements are promulgated, they are TBCs.

7.2.6.9 National Emission Standards for Hazardous Air Pollutant. Section 112 of the CAA and Section 301 (Title III) of the 1990 CAA amendments required the U.S. EPA to set uniform national emission standards for hazardous air pollutants. These standards address new and existing sources, and are oriented toward particular hazardous pollutants at their point of emission from specific sources. The U.S. EPA has established a list of the major area source categories that emit or may emit any of the 189 listed hazardous air pollutants. Treatment standards will be ARARs and they could apply to emissions from tanks and containers, municipal landfills, or surface impoundments.

7.2.6.10 Operating Permits. The 1990 CAA amendments (Title V, Sections 501 and 502) require every major source (and certain other sources) regulated under the CAA to obtain an operating permit. CERCLA on-site actions are not subject to the administrative procedures and permit requirements. However, these actions must comply with any substantive standards associated with the permit programs that are determined to be ARARs. At DDJC-Tracy, the standards could apply to some of the waste management units, or to the soil containment or removal technology, or the leachate and groundwater control technology.

7.2.6.11 RCRA Standards. Regulations under RCRA address air pollutant emissions from several activities that may occur at CERCLA sites (e.g., incineration, or air stripping). These RCRA regulations are ARARs.

7.2.6.12 California Air Regulations. California has generally adopted more stringent air standards and regulations than the CAA. DDJC-Tracy is under the supervision of the San Joaquin County Unified Air Pollution Control District. The District does not have any prohibitory rules that would apply to remedial activities at DDJC-Tracy; however, the District requires that a minimum of 95 percent of the contaminants released to the air during any remedial action be controlled the best available technology has been used. The CAA and any rules promulgated by the local air quality management district may be ARARs for some of the activities and emissions at DDJC-Tracy.

7.2.6.13 Groundwater Extraction, Treatment, and Discharge. California's SWRCB Resolution No. 68-16 (the state's Antidegradation Policy) requires that high-quality waters be maintained to the maximum extent possible. This resolution applies most often at CERCLA cleanups that involve extracting, treating, and discharging treated groundwater. Any activities that result in discharges (including injection) to high-quality water are required to use the best practicable treatment or method of control of the discharge necessary to avoid a pollution or nuisance and to maintain water quality. Best practicable treatment takes into account technical and economic feasibility. Also, hydraulic control of the contaminant plume will be maintained during extraction and injection.

7.2.6.14 The Basin Plan for the Central Valley Region, Sacramento River and San Joaquin River Basins, has designated groundwater at DDJC-Tracy with the following beneficial uses: municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply. These beneficial uses apply to all groundwater.

7.2.6.15 California SWRCB Resolution 92-49 establishes policies and procedures for the oversight of investigations and cleanup and abatement activities resulting from discharges (including injection) that affect or threaten water quality. SWRCB Resolution 92-49 requires actions for cleanup and abatement to conform to SWRCB Resolution 68-16 and state and regional water board basin plans and policies. Cleanup levels are not required to be more stringent than background levels. Cleanup levels and effluent discharge limitations need not be identical for the same site.

7.2.6.16 Part C of the Federal Safe Drinking Water Act (SDWA) set up Underground Injection Control (UIC) program requirements that are specified in 40 CFR Part 144. These regulations define a classification system, discharge prohibitions, and a permitting system for wells that inject fluids into groundwater. Any water that is injected into the groundwater at DDJC-Tracy must meet these UIC program requirements and potentially require UIC permitting.

7.2.7 Identification of Other Guidance and Criteria to be Considered

7.2.7.1 Other TBCs in evaluating remedial alternatives are federal, state, or local advisories or guidance documents that have not been promulgated. Since TBCs are not promulgated, they are not legally binding. If there are no specific federal, state, or regional ARARs for a particular chemical or remedial action, or if existing ARARs are not considered sufficiently protective, then guidance or advisory criteria should be identified and used to ensure public health and environmental protection. TBCs may provide health effect information with a high degree of credibility, technical information on performing or evaluating site investigations or remedial actions, and useful policies for dealing with hazardous substances.

7.2.7.2 Soil. In general, there are no promulgated cleanup levels available for soil. No numerical chemical-specific ARARs were identified for contamination in soil; to protect human health and the environment, chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1994) (see Section 6.7). There are also some guidelines for the allowable levels of total petroleum hydrocarbons (TPH) in soil that are based on recommendations from the Tri-Regional Board (California RWQCB, 1996). These guidelines do not constitute final cleanup goals, but rather target levels that should prevent existing TPH soil contamination from becoming a source of constituents to underlying groundwater.

7.2.7.3 Aquatic Habitat and Sediment. According to the Basin Plan, freshwater habitat is potentially a beneficial use for surface water at SWMU 4. Thus, federal ambient water quality criteria (AWQC) are chemical-specific TBCs for surface water at SWMU 4. Of the constituents detected in surface water at SWMU 4 (primarily pesticides), only DDT and dieldrin have AWQC for the protection of aquatic life (U.S. EPA, 1988b). The freshwater chronic AWQC for DDT is 1.0x10 -3 Ig/L. The freshwater chronic AWQC for dieldrin is 1.9x10 -3 Ig/L. There are no established California or federal sediment quality criteria (SQC) for the protection of aquatic life, however interim SQC have been proposed by the U.S. EPA for 17 nonpolar hydrophobic organic contaminants, including six polycyclic aromatic hydrocarbons (PAHs), seven pesticides, aniline, and polychlorinated biphenyls (PCB s) (Aroclor 1254). The current approach to developing sediment criteria involves partitioning the constituent to the water phase and evaluating bioavailability. Because there is still discussion regarding the choice of partition coefficients and the methods for determining uncertainty in the interim SQC values, the final values will differ from these interim values, though not substantially (U.S. EPA, 1989b). A number of other predictive models and methods are being investigated for constituents, but no one approach has been accepted to develop sediment-based criteria (Shea, 1988; Chapman, 1989; NOAA, 1990; Di Toro et al., 1991; Burton, 1991; U.S. EPA, 1989b).

7.2.7.4 National Oceanic and Atmospheric Administration (NOAA) effects-based sediment quality values are available for evaluating the potential for constituents in sediment to cause adverse biological effects. These values are not standards or criteria. NOAA effects range low (ER-L) values are concentrations equivalent to the lower 10 percentile of available data screened by NOAA. These values indicate the low end of the range of concentrations in specific sediments at which adverse biological effects were observed or predicted in sensitive species and/or sensitive life stages.

7.2.7.5 The effects range-median (ER-M) values are concentrations based on the median values of the NOAA-screened data at which adverse biological effects were observed or predicted. The ER-L and ER-M values are used by U.S. EPA as sediment screening values to indicate the potential for adverse ecological effects. The ER-L and ER-M values do not allow observed toxicity concentrations to be readily extrapolated from one sediment location to another. Sediment characteristics greatly influence the contaminant toxicity; thus, the ER (L and ER-M values cannot be used as direct indicators of adverse effects to aquatic organisms. U.S. EPA generally recommends further ecological testing and evaluation (when these values are exceeded) to determine the site-specific risks. The ER-L and ER-M values for constituents detected in sediment at SWMU 4 are considered chemical-specific TBCs for sediment at SWMU 4.

7.2.7.6 Groundwater. The non-promulgated water quality criteria were identified as TBCs for dieldrin in groundwater. Water quality criteria were also developed for monuron and diuron.

7.3 Operable Unit 1 Groundwater

7.3.1 Background

7.3.1.1 Operable Unit (OU) 1 is defined as the contaminated groundwater plume, on and off depot. The plume is characterized by PCE and TCE. The OU 1 ROD (WCC, 1993) established aquifer cleanup standards for TCE, PCE, and 1,1 -DCE. As described in the OU 1 ROD, the selected remedy for VOCs in OU 1 groundwater is groundwater extraction and treatment.

7.3.1.2 The OU 1 ROD documents the development and evaluation of four alternatives to address VOCs in groundwater at DDJC-Tracy. Alternative 1 considered no action to address TCE, PCE, and 1,1 -DCE. Alternative 2, institutional controls, included restrictions on drinking water wells and future residential development, an Interagency Management Agreement to manage future groundwater use at the depot, continued groundwater monitoring, and the supplying of drinking water to affected families. Alternative 3 included a system of approximately 40 extraction wells, the treatment of 1,000 gallons of groundwater per minute by air stripping, vapor-phase carbon adsorption, the injection of treated water, and continued monitoring. Alternative 4 consisted of approximately 40 extraction wells, the treatment of 1,000 gallons of groundwater per minute by air stripping, vapor-phase carbon adsorption, in situ biological treatment, the injection of treated water, and continued monitoring.

7.3.1.3 Alternative 3 was the selected alternative. Alternatives 1 and 2 were not preferred because they did not remediate the contaminated aquifer, did not protect human health and the environment, did not meet the ARARs, and would not be accepted by the community or the state.

Alternative 4 was not preferred because it is untried at full scale and would therefore require significant advance testing and experimentation. As a result it would be significantly more costly than Alternative 3. Acceptance of Alternative 4 by the agencies and the public was expected, but not certain.

7.3.1.4 The selected remedy for TCE, PCE, and 1,1 -DCE is presently under construction. The conceptual design (i.e., flow rate and number of wells) of the alternative presented in the ROD has been refined in the design process (see Section 9.5). In addition to the alternatives described above, reductive dechlorination was considered as a possible remedy during the design phase. However, given the size of the contaminant plume, the cost of installing a subsurface reductive dechlorination system was prohibitive. Alternative 3 remains the preferred alternative to address VOCs in groundwater at DDJC-Tracy, and the selection of Alternative 3 is reaffirmed in this ROD.

7.3.1.5 An Explanation of Significant Differences (ESD) (Montgomery Watson, 1996g) was approved that allows a small portion of the plume to be remediated by natural attenuation.

7.3.1.6 Studies to assess the technical and economic feasibility of achieving "background" (i.e., detection limits) for TCE, PCE, and 1,1-DCE were performed and are reported in the 3-D Groundwater Model Technical Evaluation (Montgomery Watson, 1995). It was estimated that remediation to detection limits would require approximately 50 percent more time than the time needed to attain MCLs. This would significantly increase the cost per unit removal of contaminants from the aquifer. Furthermore, strict adherence to a detection-limit remediation goal would require installation of more extensive extraction and infiltration facilities both on and off depot. Additional property acquisition and easements would be necessary. Remediation to MCLs enables the extraction and infiltration systems to be limited to government property and avoids the high incremental cost of treatment to detection limits. Therefore, this ROD reaffirms the selected remedy of extraction and treatment to MCLs with the natural attenuation of a small portion of the plume.

7.3.1.7 Other VOCs (see Table 7-1) detected in samples from various monitoring wells at DDJC-Tracy during the groundwater monitoring program include bromoform, carbon disulfide, chloroform, 1,1-DCE, cis- 1,2-DCE, trans- 1,2-DCE, methylene chloride, benzene, toluene, and xylenes. However, the concentrations of these VOCs were an order of magnitude less than the concentrations of TCE and PCE and were detected intermittently in only a few wells. The nature and extent of chloroform is discussed in Sections 5.2.2 and 5.2.7.

7.3.1.8 The Lower Tulare Aquifer was sampled when wells AG-1 and AG-3 were abandoned. No VOCs were reported. No sample could be collected from AG-2 because the well had collapsed above the Lower Tulare contaminants may have migrated through the Corcoran Clay prior to the well collapse at 375 feet bgs. However, the date of the collapse is unknown and may have occurred before the OU 1 plume migrated to this area. Concentrations of TCE and PCE within the Lower Horizon and below the Lower Horizon are relatively low. Attenuation and dilution effects are also expected to additionally reduce concentrations of TCE and PCE, if present, as groundwater transport processes continued across the Corcoran Clay and Lower Tulare Aquifer. Because over 200 feet of find-grained silty and clayey sediments (including the Corcoran Clay) are present below the permeable zone at 180 feet bgs, significant vertical migration TCE and PCE to the Lower Tulare Aquifer in locations other than connecting production wells is considered unlikely.

7.3.1.9 Based on the contamination observed below the Lower Horizon in well LM57D and the concentrations of TCE and PCE detected in the deep CPT samples collected in the vicinity of AG-2, OU 1 contaminants have migrated vertically to the water-bearing zone at 180 feet bgs. Because this zone is adjacent to the bottom of the perforated intervals observed in well AG-2, it is not known whether contaminants have migrated any deeper. However, the absence of TCE or PCE in the sample collected from AG-1, which is located directly downgradient of AG-2 in the Lower Tulare Aquifer, provides a reasonable level of certainty that the Lower Tulare Aquifer has not been contaminated.

7.3.1.10 Additional investigation of the Lower Tulare Aquifer would require drilling into and possibly through the Corcoran Clay, which may open new conduits from contaminated zones in the Upper Tulare Aquifer to uncontaminated zones. Additional groundwater sampling in the Corcoran Clay and Lower Aquifer is therefore not recommended. Based on all available data, the risk of contributing to deep aquifer contamination as a result of drilling and installing well materials through the Corcoran Clay and overlying contaminated aquifer is not warranted to obtain additional data to support this assessment.

7.3.1.11 Several pesticides and herbicides (primarily dieldrin, chlordane, DDD, DDE, DDT, monuron, and diuron) have also been detected in groundwater at DDJC-Tracy (see Table 7-1). Pesticides have been predominantly detected in wells in the northwestern portion of the depot. On the basis of analytical modeling results (Montgomery Watson, 1996a), the primary source areas for pesticides and herbicides are SWMUs 2 and 3. In particular, the dieldrin plume appears to emanate from the lagoons and extends into the Tracy Annex. Monuron and diuron occur in a similar distribution. There is insufficient groundwater data to confirm the shape of the monuron and diuron plume; however, the occurrence of monuron and diuron in groundwater at DDJC-Tracy has been interpreted as the result of the source areas at SWMUs 2 and 3. The occurrence of all other pesticides and herbicides in groundwater is intermittent. In addition, the concentrations of other pesticides are generally below numerical beneficial use limits.

7.3.1.12 Dieldrin has historically been detected at low concentrations in groundwater from 26 monitoring wells (Montgomery Watson, 1996a). Monuron and diuron have been detected in 24 and 14 wells, respectively. The majority of consistent monuron, diuron, and dieldrin detections are in the Above Upper or Upper Horizon wells downgradient from SWMU 2. Isolated detections of dieldrin have also occurred in the Above Upper Horizon Wells downgradient from the Storm Drain Lagoon (SWMU 4), Burn Pit No. 2 (SWMU 8), and the IWPL (SWMU 33). The background threshold values for dieldrin, monuron, and diuron are 0.005 Ig/L, 0.163 Ig/L, and 0.144 Ig/L, respectively. These background levels were based upon detection limits derived from use of a modified method as part of an initial background study These detection limits were not reproducible. The numerical beneficial use limit (Cal/EPA and USEPA Cancer Potency Factor) for dieldrin is 0.002 Ig/L. No federal or California MCLs have been established for dieldrin, monuron, or diuron. The California Action Level for dieldrin is 0.05 Ig/L (RWQCB, 1995). The numerical beneficial use limit (SNARL) for monuron and diuron is 10 Ig/L.

7.3.1.13 Total concentrations of arsenic (see Table 7-1) have consistently been detected at values slightly greater than background in two Above Upper and Upper horizon wells with elevated turbidity. Arsenic has also been detected intermittently in nine other Above Upper and Upper Horizon wells in the northwest corner of the depot and downgradient from SWMUs 2 and 3. The maximum detected value of total arsenic is 7.4 Ig/L compared to the MCL of 50 Ig/L and the background threshold value of 3 Ig/L. Manganese has been consistently detected above the background threshold value in LM27AA. The maximum concentration of manganese was 1,640 Ig/L, compared to a background threshold value of 338 Ig/L. The source of manganese in this location is the former manganese ore stockpiles that were previously located along the northern fenceline at DDJC-Tracy. Contaminant transport occurred as rainwater leached through the stockpiles and became acidic because of sulfides in the ore. The ore may also have been a source for arsenic. The source for manganese in groundwater is no longer present. Manganese and barium have also been detected downgradient from SWMUs 2, 3, 4, and 33. The detected concentrations of barium are only slightly greater than background and have never exceeded the MCL. No dissolved concentrations of any other metal were detected consistently above background in samples collected from wells at DDJC-Tracy.

7.3.1.14 Based on a review of historical groundwater monitoring data, dieldrin contamination in groundwater warrants remediation. The analysis of all groundwater COPCs is summarized in Table 7-1. The general response actions developed for dieldrin are discussed below.

7.3.2 Remedial Action Objectives

As explained in Section 7.3.1, the selected remedy for VOC contamination in groundwater was reevaluated and determined to be the most viable remedy. As a result, RAOs are presented for dieldrin, the only remaining chemical of concern (COC) in groundwater. The RAOs for the dieldrin in groundwater in OU 1 are:

- Remediate hot spots (i.e., areas with the highest levels of dieldrin contamination in groundwater);
- Minimize contaminant transport off-depot; and

- Minimize dieldrin migration and remediate to the aquifer cleanup level of 0.05 micrograms per liter (Ig/L) based on a California Action Level.

7.3.3 Remedial Alternatives

Remedial alternatives for VOCs are discussed in Section 7.3.1. Four modifications of the selected remedial alternative for VOCs were evaluated to address dieldrin in OU 1 groundwater. Currently, three areas of groundwater are contaminated with dieldrin levels above the California Action Level of 0.05 Ig/L. One area is located near SWMUs 2 and 3, one is near SWMU 8, and one is within the Tracy Annex. These areas all lie within the OU 1 VOC plume. The full-scale OU 1 groundwater remediation system includes two extraction wells with liquid-phase carbon to treat dieldrin at the wellhead. Table 7-2 describes the four alternatives that would modify the OU 1 groundwater remedy:

- No Further Action;

- Institutional Controls (land use restrictions and groundwater monitoring);

- Groundwater Extractions and Treatment- Option 1 (wellhead pretreatment with GAC at nine extraction wells and air stripping to remove VOCs); and

- Groundwater Extraction and Treatment - Option 2 (wellhead pretreatment with granular activated carbon (GAQ at three extraction wells and air stripping to remove VOCS).

7.4 Group A Sites

7.4.1 Remedial Action Objectives

Prevent the migration of the following VOCs in soil that could cause groundwater contamination:

- SWMU 1/Area 2 - PCE and TCE;

- Area 1 Building 237 - PCE; and

- Area 3 - PCE and TCE.

To reach this RAO, site-specific soil cleanup levels were developed that are protective of the background groundwater quality.

7.4.2 Remedial Alternatives

Four remedial alternatives were evaluated at the Group A sites (SWMU 1/Area 2, Area 1 Building 237, and Area 3). These sites are characterized mainly by soil contaminated with VOCs and are considered potential sources to OU 1 groundwater contamination. PCE and TCE are present at SWMU 1/Area 2 and Area 3. PCE is present at Area 1 Building 237. Table 7-3 describes the four remedial actions considered for these sites:

- No Further Action;

- Groundwater Extraction and Treatment - Option 1 (wellhead pretreatment with GAC

- Institutional Controls;

- Soil Vapor Extraction (SVE); and

- Excavation and Disposal.

7.5 Group B Sites

There are nine Group B sites (SWMUs 4, 6, 7, 8, 20/23, 24, 27, the Building 30 Drum Storage Area and the surface and near-surface soils in the North Depot Area). Specific RAOs and alternatives were developed for each site and are discussed separately. To reach these RAOs, site-specific soil cleanup standards were developed for each chemical of concern. The cleanup standards will leave a residual cancer risk that is no greater than 1x10 -6, a residual hazard index that is no greater than 1.0, and will be protective of the background groundwater quality.

7.5.1 SWMU 4 - Storm Drain Lagoon

7.5.1.1 Remedial Action Objectives. The RAOs for SWMU 4 are:

- Prevent release of COCs (DDT and dieldrin) from sediments that would cause surface water concentrations that exceed federal AWQC for protection of aquatic life;

- Prevent ecological receptors from being exposed to COCs (DDT, lead, and PCBs) in surface water above aquatic standards; and

- Prevent ecological receptors from being exposed to COCs in sediment.

7.5.1.2 Remedial Alternatives. Three remedial alternatives were evaluated for SWMU 4, a storm drain lagoon that collects all storm water runoff from DDJC-Tracy. Table 7-4 describes the three remedial actions considered for this site:

- Prevent the migration of pesticides (dicamba, dieldrin, endrin, heptachlor, lindane, and 2,4,5-T) in the soil that could cause groundwater contamination.

7.5.2.2 Remedial Alternatives. Four remedial alternatives were evaluated for SWMU 6, which is located on the west side of Building 28 in the eastern portion of DDJC-Tracy. Table 7-5 describes the four remedial actions considered for this site:

- No Action;

- Institutional Controls (implement land use restrictions and groundwater monitoring);

- In Situ Stabilization (immobilize contaminated materials); and

- Excavation and Disposal (excavate contaminated soil and transport it to a Class I or II disposal facility).

7.5.3 SWMU 7 - Burn Pit No. 1

7.5.3.1 Remedial Action Objectives. The RAO for SWMU 7 is:

Prevent the migration of the following COCs in the soil that could cause groundwater contamination:

- Pesticides and herbicides (2,4-D, linuron, dieldrin, and simazine);

- SVOCs (bis(2-ethylhexyl]phthalate);

- VOCs (1,2-dichloroethene [1,2-DCE] and TCE); and

- Petroleum hydrocarbons (diesel).

7.5.3.2 Remedial Alternatives. Four remedial alternatives were evaluated for SWMU 7, which consists of seven pits that operated before warehouse buildings 15, 19, and 21 were constructed. These pits were used for disposing of medical supplies containing mercury and phosphate compounds, narcotics, radiological supplies, etc. In addition, other materials (both solid and liquid) that were stored or used at DDJC-Tracy may have been burned and/or buried at SWMU 7. The ashes were removed and transported to off-site landfills during the later years of operation. Table 7-6 describes the four remedial actions considered for this site:

- No Action;

- Institutional Controls (implement land use restrictions and groundwater monitoring);

- In Situ Stabilization with Institutional Controls (immobilize the contaminated materials); and

- Excavation and Disposal with Institutional Controls (excavate the contaminated soils and transport to a Class I disposal facility).

7.5.4 SWMU 8 - Burn Pit No. 2

7.5.4.1 Remedial Action Objectives. The RAOs for SWMU 8 are:

- Prevent future construction workers from being exposed to the following COCs in the soil that would cause an excess cancer risk greater than 10 -6 or a hazard index greater than 1.0:

  - Pesticides (total DDX and dieldrin);

- Prevent the migration of the following COCs in the soil that could cause groundwater contamination;

  - SVOCs (diethylphthalate, bis[2-ethylhexyllphthalate, 2,4-dinitrotoluene, and naphthalene);

  - Pesticides and herbicides (chlordane, 2,4-D, DDT, DDD, dieldrin, lindane, linuron, MCPA, and simazine); and

  - Petroleum hydrocarbons (diesel, motor oil, and gasoline).

7.5.4.2 Remedial Alternatives. Four remedial alternatives were evaluated for SWMU 8, a single large burn pit approximately 16 feet deep, 250 feet long, and 30 feet wide. Petroleum hydrocarbons were detected in deep soils extending to the water table (21 feet below ground surface at maximum concentrations of 2,600 mg/kg (TPH as diesel), 70 mg/kg (TPH as gasoline), and 5,600 mg/kg (TPH as motor oil). Table 7-7 describes the four remedial actions considered for this site:

- No Action;

- Institutional Controls (implement land use restrictions and groundwater monitoring);

- Bioventing (enhance biodegradation in the subsurface by installing a blower and three air-injection well clusters); and

- Excavation and Disposal (excavate the contaminated soil and transport it to a Class I or other disposal facility in compliance with state and federal laws and regulations).

7.5.5 SWMU 20 - Aboveground Solvent Tank Building 26 Recoup Operations and Area 1 Building 10

7.5.5.1 Remedial Action Objectives. The RAO for SWMU 20:

- Prevent the migration of the following COCs in the soil that could cause groundwater contamination that exceeds appropriate regulatory standards and health-based concentrations:

  - VOCs (TCE, ethylbenzene, and xylenes);

  - SVOCs (diethylphthalate, 2,4-dinitrophenol, pentachlorophenol [PCP], and 2,4,6-trichlorophenol);

  - Pesticides and herbicides (dieldrin, methiocarb, MCPA, and linuron); and

  - Petroleum hydrocarbons (diesel).

7.5.5.2 Remedial Alternatives. Four remedial alternatives were evaluated for SWMU 20, an aboveground solvent tank located in Area 1 Building 10. Table 7-8 describes the four remedial actions considered for this site:

- No Action;
- Institutional Controls;
- SVE, Excavation and Disposal, and Natural Attenuation (excavate the contaminated soil from SWMU 20 and SWMU 26 and transport it to a Class I disposal facility; install an SVE system near soil boring [SB] 108 [Area 1 Building 6] and SB431 [SWMU 23]); and
- Excavation and Disposal (excavate the contaminated soil and transport it to a Class I disposal facility).

7.5.6 SWMU 24 - Petroleum Waste Oil Tank

7.5.6.1 Remedial Action Objectives. The RAOs for SWMU 24 are:

- Prevent future depot workers from being exposed to toluene in the soil that would cause a hazard index greater than 1.0.
- Prevent the migration of the following COCs in the soil that could cause groundwater contamination that exceeds appropriate regulatory standards and health-based concentrations.

  - VOCs (acetone, 2-butanone [MEK], ethylbenzene, 2-hexanone, 4-methyl-2-pentanone, toluene, and xylenes);

  - SVOCs (2,4-dimethylphenol, fluoranthene, 2-methylnaphthalene, 4-methylphenol, naphthalene, phenenthrene, phenol, and pyrene); PCBs (Aroclor 1260)

  - Pesticides (carbofuran, lindane, phorate, and ronnel); and

  - Petroleum hydrocarbons (diesel and gasoline).

7.5.6.2 Remedial Alternatives. Five remedial alternatives were evaluated for SWMU 24, a 500-gallon underground storage tank (UST) that was used to store petroleum wastes between 1961 and 1988. The average biodegradable hydrocarbon concentration detected at SWMU 24 is 3,000 mg/kg. Table 7-9 describes the five remedial actions considered for this site:

- No Action;
- Institutional Controls (implement land use restrictions and groundwater monitoring);
- Boiventing (install air-injection well blower);
- Excavation and Disposal (excavate the contaminated soil and transport it to a Class I disposal facility); and
- Excavation and Onsite Bioremediation (excavate the soil exceeding the cleanup standards and treat above ground with on-site bioremediation method such as landfarming or a slurry-phase reactor).

7.5.7 SWMU 27 - Building 206 Roundhouse Sump/Area 1 Building 206

7.5.7.1 Remedial Action Objective. The RAOs for SWMU 27 are:

- Prevent future depot workers from being exposed to the following COCs in the soil that would cause an excess cancer risk greater than 1x10 -6:

  - PAHs (benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, and indeno[1,2,3-cd]pyrene); and

  - PCBs (Aroclor 1260).

- Prevent the migration of the following COCs in the soil that could cause groundwater contamination that exceeds appropriate regulatory standards and health-based concentrations:

  - VOCs (TCE);

  - Herbicides (2,4-D, MCPA, and 2,4,5-T); and

  - Petroleum hydrocarbons (motor oil).

7.5.7.2 Remedial Alternatives. Three remedial alternatives were evaluated for SWMU 27, which consists of the waste oil sump, the service pit, the locomotive pit, and the area around the floor drain in Building 206. Table 7-10 describes the three remedial actions considered for this site:

- No Action;

- Institutional Controls (implement land use restrictions and groundwater monitoring); and

- Excavation and Disposal (excavate the contaminated soil and transport it to a Class I disposal facility).

7.5.8 Building 30 Drum Storage Area

7.5.8.1. Remedial Action Objectives. The RAO for the Building drum 30 Storage Area is:

- Prevent the migration of benzyl alcohol, bis(2-ethylhexyl)phthalate, diethylphthalate, and di-n-butylphthalate in the soil that could cause groundwater contamination that exceeds appropriate regulatory standards and health-based concentrations.

7.5.8.2. Remedial Alternatives. Three remedial alternatives were evaluated for the Building 30 Drum Storage Area which is located in the southern portion of the depot, on the south side of D Street. Table 7-11 describes the three remedial actions considered for this site:

- No Action;

- Institutional Controls (implement land use restrictions and groundwater monitoring); and

- Excavation and Disposal (excavate contaminated soil and transport to Class I or II disposal facility).

7.5.9 Surface and Near-Surface Soils - Northern Depot Area

7.5.9.1 Remedial Action Objectives. The RAO for the Northern Depot Area is:

- Prevent future depot workers from being exposed to arsenic and manganese in the surface and near-surface soils that would cause a hazard index greater than 1.0.

7.5.9.2 Remedial Alternatives. Four remedial alternatives were evaluated for the remediation of metals in shallow soils. The data from the surface and near-surface soils indicate that arsenic and manganese in the soil pose a threat to human health in the northern area of the depot. Table 7-12 describes the four remedial actions considered for this site:

- No Action;
- Institutional Controls (implement land use restrictions and groundwater monitoring);
- Asphalt Cover (install an asphalt cover over the soil with elevated levels of arsenic and manganese); and
- Excavation and Disposal (excavate the contaminated soil and transport it to a Class II or III disposal facility).

7.6 Group C Sites

There are two Group C sites: SWMUs 2 and 3, and SWMU 33. Specific RAOs and alternatives were developed for each site and are discussed separately. To develop these RAOs, site-specific soil cleanup standards were developed for each constituent of concern.

7.6.1 SWMUs 2 and 3 - Sewage and Industrial Waste Lagoons

7.6.1.1 Remedial Action Objectives. The RAO for SWMUs 2 and 3 is:

- Prevent the migration of dieldrin, DDT, DDD, DDE, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate in post-removal-action soil that could cause groundwater contamination that exceeds appropriate regulatory standards and health-based concentrations.

7.6.1.2 Remedial Alternatives. Three remedial alternatives were evaluated for SWMUs 2 and 3, which are located in the north part of the depot west of and adjacent to the sewage treatment plant. Table 7-13 describes the three additional remedial actions considered for this site:

- No Action;
- Institutional Controls (implement land use restrictions and groundwater monitoring); and
- Excavation and Disposal (a geofabric filter and backfill will be used to isolate ecological receptors from contaminants left in place).

7.6.2 SWMU 33 - Industrial Waste Pipeline

7.6.2.1 Remedial Action Objective. The RAO for SWMU 33 is:

- Prevent the migration of aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate in the postremoval-action soil that could cause groundwater contamination that exceeds appropriate regulatory standards and health-based concentrations.

7.6.2.2 Remedial Alternatives. Three remedial alternatives were evaluated for SWMU 33, a 4-inch-to 7-inch-diameter industrial waste pipeline buried 2 feet below grade. These remedial alternatives were developed assuming that the removal actions recommended in the January 1996 EE/CA would be completed. Table 7-14 describes the three additional remedial actions considered for this site:

- No Action;

- Institutional Controls (implement land use restrictions and groundwater monitoring);

- Limited Excavation and Disposal (excavate the contaminated soil and transport it to a Class I disposal facility), grouting, and institutional controls (groundwater monitoring); and

- Excavation and Disposal (excavate contaminated soil and transport it to a Class I disposal facility).

7.7 No Further Action Sites

7.7.1 Twenty-one sites have been identified as "No Further Action (NFA)" sites based on site specific data developed in the RI/FS. These sites are categorized as NFA sites because they meet the following criteria:

- No COCs pose actual or potential threats to groundwater beneficial uses or exceed background concentrations;

- No COCs pose an excess cancer risk greater than 1x10 -6 to depot workers, construction workers, or children on the installation;

- No COCs have a non-cancer hazard index greater than 1.0 for depot workers, construction workers, or children on the installation; and

- There is no ecological risk.

7.7.2 One NFA site, SWMU 10A, does not fully meet the above criteria. Soil contamination at SWMU 10A does pose a potential threat to background groundwater quality. Remediation was not recommended because of the cost, the limited number of detections, and questions regarding the reliability of the data (Montgomery Watson, 1996a). Therefore, the site has been designated as an NFA site.

7.7.3 ARARs would not be violated by not taking action on these NFA sites. No chemical specific ARARs or TBCs for soil would be exceeded. All concentration of contaminants in soil are below such ARARs as the Designated Level Methodology (DLM) values for sediments, surface soils, and subsurface soils specified by the RWQCB, State and federal hazardous waste criteria (22 CCR 66261 and 40 CFR 261), and the USEPA Toxic Substance Control Act (TSCA).

7.7.4 Similarly, no groundwater ARARs or TBCs would be violated by not taking action at these sites. No National or State MCLs (40 CFR 141) would be exceeded and beneficial uses of groundwater specified in the RWQCB Basin Plan would not be affected. No requirements of the Porter-Cologne Water Quality Act or SWRCB Resolution 68-16 would be violated by not taking action at these sites.

7.7.5 These sites are identified in Table 7-15, along with the rationale for their NFA designation.

Table 7-1. Groundwater Chemicals of Concern: Detection Frequency, Remedial Decision Rationale, and Risk Characterization, DDJC-Tracy

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk (x-4)	Hazard Quotient d
Volatile Organic Compounds	560	NC	2.3	770/1465	Aquifer cleanup level established	Prevalent depot-related chemical of concern	0.37	NC
Trichloroethene (TCE)					Effluent treatment standard established	Contributes significantly to human health risk		
						Risk based on maximum concentration in 1994 (130 Ig/L)		
Tetrachloroethene (PCE)	457	NC	0.7	661/1465	Aquifer cleanup level established	Prevalent depot-related chemical of concern	0.50	NC
					Effluent treatment standard established	Contributes significantly to human health risk		
						Risk based on maximum concentration in 1994 (120 Ig/L)		
1,1-Dichloroethene (DCE)	37	NC	6	55/1465	Aquifer cleanup level established	Depot-related chemical of concern	3.71	NC
					Effluent treatment standard established	Contributes significantly to human health risk		
Carbon Tetrachloride	5	NC	5	1/1465	NFA; effluent treatment standard established	Detected levels may not be depot-related	0.10	0.62
						Constituent detected infrequently		
Chloroform	5	NC	1.0	78/1465	NFA; effluent treatment standard established	Depot-related chloroform concentrations are an order of magnitude below the MCL	0.14	NC

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk (x-4)	Hazard Quotient d
Benzene	10	NC	1	9/1276	NFA	Constituent detected infrequently (less than 1% frequency)	e	e
cis-1,2-Dichloroetheric	39	NC	6	10/905	NFA	Constituent detected infrequently (1% frequency of detections) Constituent detected below beneficial use limit (MCL)	e	e
trans-1,2-Dichloroethene	10	NC	10	6/1341	NFA	Constituent detected infrequently (less than 1% frequency)	e	e
Toluene	19	NC	42	56/1276	NFA	Constituent detected infrequently (less than 5% frequency) Constituent detected well below beneficial use limit (MCL)	NA	0.002 8
1,1,1-Trichloroethane	16	NC	200	21/1465	NFA	Constituent detected infrequently (less than 2% frequency) Constituent detected well below beneficial use limit (MCL)	e	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk (x-4)	Hazard Quotient d
Xylenes (m,p + o)	10	NC	17	11/909	NFA	Constituent detected infrequently (less than 2% frequency) Constituent detected well below beneficial use limit (MCL)	NA	0.00007 8
Pesticides and Herbicides								
2,4-D	2.78	0.101 f	70	l8/284	NFA	Constituent detected infrequently (less than 30% frequency) Constituent detected well below beneficial use limit (MCL) and only slightly above background threshold value. Source areas will be removed (SWMU 2)	e	e
2,4-DB	0.209	0.101 f	290	2/294	NFA	Constituent detected infrequently (only once in 2 wells) Constituent detected well below beneficial use limit (PRG) and only slightly above background threshold value	e	e
Aldrin	0.02	0.005 f	0.002	4/574	NFA	Constituent detected infrequently (only once in 4 wells) Constituent detected well below the beneficial use limit (CA action level)	e	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk (x-4)	Hazard Quotient d
Alpha-BHC	0.008	0.005 f	0.15	1/573	NFA	Constituent detected infrequently (detected once in one well) Constituent detected below beneficial use limit (Proposition 65 regulatory level)	e	e
Carbaryl (Sevin)	2.75	0.382 f	60	1/185	NFA	Constituent detected infrequently (only once in one well) Constituent detected below beneficial use limit (CA action level)	NA	0.0002 8
Chlordane	0.7	0.104 f	0.03	25/574	NFA; effluent treatment standard established	Constituent detected intermittently (less than 50% frequency) in 11 wells. The source areas will be removed (SWMUs 2,3, and 8) Constituent generally detected below beneficial use limit (MCL)	0.06 h	NC
Delta-BHC	0.282	0.005 f	500	6/573	NFA	Constituent detected infrequently (only once in 6 wells)	e	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk (x-4)	Hazard Quotient d
DDD	0.052	0.005 f	0.15	16/574	NFA; effluent treatment standard established	Constituent detected infrequently in 9 wells (less than 25% frequency). The source areas will be removed (SWMUs 2,8, and 33) Constituent detected below beneficial use limit (CA/EPA cancer potency factor)	e	e
DDE	0.116	0.005 f	0.1	25/574	NFA; effluent treatment standard established	Constituent detected infrequently in 9 wells (less than 25% frequency). The source areas will be removed (SWMUs 2, 3, 8, and 33) Constituent detected below beneficial use limit (CA/EPA) cancer potency factor)		
DDT	0.262	0.005 f	0.1	23/574	NFA; effluent treatment standard established	Constituent detected intermittently in 7 wells (less than 25% frequency). The source areas will be removed (SWMUs 2, 3, and 33) Constituent generally detected below beneficial use limit (NAS drinking water standard)	e	e
Diazinon	0.347	1.00 f	0.6	1/236	NFA	Constituent detected infrequently (less than 25% frequency in only one well) Constituent detected below beneficial use limit (SNARL)	e	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk (x-4)	Hazard Quotient d
Dicamba (Banvel)	0.024	0.091 f	210	1/284	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in one well) Constituent detected well below beneficial use limit (EPA-SNARL)	e	e
Dichlorvos (DDVP)	0.325	1.00 t	1.00	1/236	NFA	Constituent detected infrequently (less than 20% frequency; detected only once in one well). Constituent detected below background threshold value	e	e
Dieldrin	0.569	0.005 f	0.002	114/574	Aquifer cleanup level established	Constituent detected in 26 wells (20% to 100% frequency)	0.62	NC
					Effluent treatment standard established	The source areas will be removed (SWMUs 2, 3, 6, 8, 20, and 33)		
Diuron	3.31	0.144 f	14	26/185	NFA; effluent treatment standard established	Constituent detected in 14 wells. Plume has been identified downgradient of SWMU 2/3 with OU 1 capture zone and will be treated by dieldrin treatment system. Constituent detected below beneficial use limit (EPA-SNARL)	NA	0.005

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Endosulfan A	0.166	0.005 f	0.93/2.0	4/573	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 4 wells) Constituent not detected in site soils. Originates from off-site source area (agricultural non-point sources) Constituent detected well below water quality criterion	e	e
Endosulfan B	0.007	0.005 f	0.93/2.0	2/573	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 2 wells) Constituent not detected in site soils. Originates from off-site source area (agricultural non-point sources) Constituent detected well below water quality criterion	e	e
Endosulfan Sulfate	0.295	0.005 f	0.93/2.0	5/574	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 5 wells) Constituent not detected in site soils. Originates from off-site source area (agricultural non-point sources) Constituent detected well below water quality criterion	e	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Endrin	0.066	0.005 f	2	13/573	NFA	Constituent detected intermittently (less than 50% frequency; detected only in 4 wells) The sources areas will be removed (SWMU 2/3) Constituent detected well below water quality criterion	NA	0.0008
Heptachlor	0.025	0.005 f	0.006	3/574	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 3 wells) and data validation indicates that the presence of this compound is unconfirmed Constituent not detected in site soils. Originates from off-site source area (agricultural non-point sources) Constituent detected at or below beneficial use limit (MCL)	e	e
Heptachlor Epoxide	0.029	0.005 f	0.003	9/574	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 9 wells) and data validation indicates that the presence of this compound is unconfirmed The source area will be removed (SWMU 6)	e	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Lindane (Gamma-	0.046	0.005 f	0.03	4/573	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 5 wells) The sources area will be removed (SWMU 6) Constituent detected at or below beneficial use limit (MCL)	e	e
Linuron	23.8	0.157 f	1.4	6/185	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in 5 wells) Constituent originates from off-site source area (agricultural non-point sources) Constituent generally detected below beneficial use limit (EPA RFD)	NA	0.09
Methiocarb	4.57	1.36 f	1.36	3/185	NFA	Constituent detected intermittently (detected once in only 3 wells) Constituent originates from off-site source area (agricultural non-point sources)	NR	NR

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Methoxychlor	0.004	0.005 f	40	1/569	NFA	Constituent detected infrequently (less than 25% frequency; detected only once in one well) Constituent detected below beneficial use limit (MCL)	e	e
Monuron	3.14	0.163 f	10	40/185	NFA; effluent treatment standard established	Constituent detected inconsistently in 24 wells Plume has been identified downgradient of SWMU 2/3 within OU 1 capture zone and will be treated by dieldrin treatment system. Constituent detected below beneficial use limit (SNARL)	NA	0.007
Simazine	2.07	0.492 f	4	7/236	NFA	Constituent detected intermittently in only 4 wells The source areas will be removed (SWMUs 2, 3, and 4) Constituent detected below beneficial use limit (MCL)	0.02	NC

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Dioxins/Furans	2.7x10 -7	1x10 -6	2.7x10 -7	2/17	NFA	Constituent detected below beneficial use limit. Only the least toxic congener (OCDD) was detected at concentrations well below the background threshold value Technical economic evaluation indicates that it is economically infeasible to remediate dioxins/furan in groundwater	I	I
Metals								
Arsenic (total)	7.4	3	50	40/804	NFA	Constitutent detected intermittently in 10 wells; frequency of detections may be due to elevated turbidity The source areas will be removed (SWMUs 2/3) Constituent detected well below beneficial use limit (MCL) and only slightly above background threshold value	0.4	NC
Arsenic (dissolved)	7.5	4	50	15/594	NFA	Constituent detected intermittently in only 4 wells Constituent detected well below beneficial use limit (MCL) and slightly above background threshold value	e	0.4 g

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Antimony (total)	250	3	6	7/803	NFA	Constituent detected intermittently in 5 wells (less than 25% frequency)	NA	i
Antimony (dissolved)	3.9	3.9	6	3/498	NFA	Constitutent detected intermittently in 3 wells (other detections are due to filter contamination) Constituent detected below beneficial use limit (MCL) and slightly above background threshold value	NA	e
Barium (total)	572	145	1,000	63/791	NFA	Constituent detected in 12 wells; other detections are due to elevated turbidity Constituent detected well bellow beneficial use limit (MCL) and slightly above background threshold value The pattern of detections is not suggestive of site contamination. Most detections ranged from 50-150 Yg/L	NA	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Barium (dissolved)	763	99.8	1,000	60/473	NFA	Constituent detected in 14 wells Constituent detected below beneficial use limit (secondary MCL) The pattern of detections is not suggestive of site contamination. Most detections ranged from 50-150 Yg/L	NA	e
Beryllium (total)	0.1	0.1	4	2/804	NFA	Constitutent detected intermittently in 2 wells (less than 20% frequency); dissolved beryllium not detected above background threshold value Constituent detected below beneficial use limit (MCL) and only slightly above background threshold value	e	e
Boron (total)	7,090	2,590	600	18/643	NFA	Constituent detected intermittently in 14 wells (less than 50% frequency) Detections may be due to elevated turbidity Constituent originates from off-site source area (agricultural non-point sources)	NA	e
Boron (dissolved)	3,380	2360	600	5/315	NFA	Constituent detected intermittently in only 4 wells (less than 25% frequency)	NA	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Yg/L)	Background Threshold Values b (Yg/L)	Beneficial Use Numerical Limits c (Yg/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Cadmium (total)	40	4.4	5	6/804	NFA	Constituent detected intermittently in 6 wells (less than 20% frequency); dissolved cadmium not detected above background threshold value Constituent generally detected below beneficial use limit (MCL)	NA	e
Chromium (total)	44.7	35.7	50	23/810	NFA; effluent treatment standard established	Constitutent detected intermittently in 17 wells (less than 25% frequency) Detections may be due to elevated turbidity Constituent detected below beneficial use limit (MCL) and only slightly above background threshold value	e	e
Chromium (dissolved)	43	30	50	14/595	NFA	Constituent detected intermittently in 8 wells (less than 50% frequency) Constituent detected beneficial use limit (MCL)	e	e
Copper (total)	90	12.9	1,000	17/814	NFA	Constituent detected intermittently in 14 wells (less than 25% frequency); other detections are due to elevated turbidity Constituent detected below beneficial use limit (secondary MCL)	NA	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Copper (dissolved)	70	20.2	1,000	9/595	NFA	Constituent detected intermittently in 8 wells (less than 30% frequency) Constituent detected below beneficial use limit (secondary MCL)	NA	e
Lead (total)	20.4	21.2	15	14/875	NFA	Most detections are due to elevated turbidity; exceeds back-ground threshold value in 5 wells intermittently. Not related to site contamination. Dissolved lead not detected	NA	e
Manganese (total)	1,640	338	50	13/723	NFA	Constituent detected consistently in only one well (less than 25% frequency) Most detections are due to elevated turbidity Technical and economic evaluation indicates that it is economically infeasible to remediate manganese in groundwater	NA	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Manganese (dissolved)	880	17.5	50	41/407	NFA	Constituent detected intermittently in 13 wells (consistently detected in 3 wells) Trend of decreasing concentrations observed Constituent detected above beneficial use limit (secondary MCL) Technical and economic evaluation indicates that it is economically infeasible to remediate manganese in groundwater	NA	e
Mercury (total)	6.62	0.2	2	6/799	NFA	Constituent detected intermittently in 5 wells (less than 25% frequency). Other detections may be due to elevated turbidity Constituent generally detected below beneficial use limit (MCL)	NA	e
Mercury, (dissolved)	1.95	0.2	2	3/407	NFA	Constituent detected intermittently in 5 wells Constituent detected above beneficial use limit (MCL)	NA	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Nickel (total)	25.8	21.2	100	2/804	NFA	Constituent detected intermittently in 2 wells (less than 20% frequency); dissolved nickel not detected above background threshold value Constituent detected below beneficial use limit (MCL) and only slightly above background threshold value	NA	e
Nitrate, as N	26.3	25.1	45	4/232	NFA	Constituent generally detected below beneficial use limit (state MCL) and background threshold value	NA	e
Selenium (total)	7.87	12.1	50	6/804	NFA	Constituent detected infrequently in 5 wells (less than 25% frequency)	NA	I
Selenium (dissolved)	9.1	6.0	50	4/594	NFA	Constituent detected intermittently in 3 wells (less than 35% frequency) Constituent detected below beneficial use limit (MCL) and only slightly above background threshold value	NA	e
Vanadium (total)	43.1	30.2	50	17/785	NFA	Constituent detected intermittently in 17 wells (less than 25% frequency). Other detections may be due to elevated turbidity. Constituent detected below beneficial use limit (MCL)	NA	e

Table 7-1. (Continued)

Chemical of Concern	Maximum Detected Concentration a (Ig/L)	Background Threshold Values b (Ig/L)	Beneficial Use Numerical Limits c (Ig/L)	Frequency Detected Versus Frequency Analyzed a	Remedial Decision	Remedial Decision Rationale	Excess Cancer Risk d (x-4)	Hazard Quotient d
Vanadium (dissolved)	20	16.2	50	10/467	NFA	Constituent detected intermittently in 8 wells (less than 30% frequency) Constituent detected below beneficial use limit (MCL)	NA	e

a Database includes quarterly monitoring results from January 1987 to June 1995; results obtained in earlier sampling events were not used in the statistics provided for metals because the quality of these data is lower than the quality of data collected after 1991. Samples with elevated turbidity were not counted in the statistics provided for metals. Additionally, unconfirmed outliers were eliminated from the statistical data provided on this table.
b Background threshold values are presented for the "A" horizon.
c Beneficial use numerical limits and the types of water quality goals that these values represent are presented in Appendix P, Table P-10 of the RI/FS (Montgomery Watson, 1996a). Numerical limits were updated based on input from the CVRWQCB.
d Risk numbers are based on maximum concentrations reported in the monitoring well database unless otherwise noted.
e Chemical not reported as a contaminant in the Phase I RI/RA (WCC, 1992b), the OU 1 ROD, or in wells located on the Annex or off-depot; therefore, risks were not calculated.
f No monuron or diuron has been detected in the background wells. The value cited is the lowest detection limit from a modified method that was previously used. These detection limits have not been reproducible.

NA = not applicable; chemical is not an oral carcinogen.
NC = not calculated; applies to either the risk assessment (Section 5.2.15 of Appendix R of the RI/FS [Montgomery Watson, 1996a]) or background threshold values.
NFA = No Further Action

Table 7-2. Remedial Alternatives for OU 1 Groundwater

Description of Details	Alternatives No Further Action	Institutional Controls	Groundwater Extraction and Treatment-Option 1	Groundwater Extraction and Treatment-Option 2
Treatment Process Description	* No treatment in addition to tile full-scale OU 1 groundwater remediation system.	* No treatment in addition to the full scale OU 1 groundwater remediation system.	* Use wellhead pretreatment (GAC) at the nine extraction wells to remove dieldrin. * Treat water at OU 1 treatment plant (air stripping) to remove VOCs.	* Use wellhead pretreatment (GAC) at three wells to remove dieldrin. * Treat water at OU 1 treatment plant (air stripping) to remove VOCs.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of dieldrin in the groundwater have been detected.	* None.	* None.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Extraction wells for the OU 1 groundwater remediation system are located in the vicinity of the greatest dieldrin concentrations detected in groundwater. * Per CERCLA guidance, five-year reviews involving further groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program. * Extraction wells for the OU 1 groundwater remediation system are located in the vicinity of the greatest dieldrin concentrations detected in groundwater. * Per CERCLA guidance, five-year reviews involving further groundwater sampling will be conducted.	* Additional groundwater extraction wells are installed in the Above Upper Horizon in the following locations: SWMUs 2 and 3 (three wells), SWMU 8 (two wells), and the Tracy Annex (four wells). Estimated flow rate at each extraction well is 5 gallons per minute (gpm). * Treated groundwater (no VOC contamination) is reinjected from SWMU 8 using injection facilities. * Groundwater monitoring is included in Well Monitoring Program.	* Three additional ground-water extraction wells are installed in the Above Upper Horizon near SWMUs 2 and 3. Estimated flow rate at each extraction well is 5 gpm. * Treated water is discharged to infiltration gallery. * Groundwater monitoring is included in Well Monitoring Program.

Table 7-2. (Continued)

Description of Details	Alternatives: No Further Action	Institutional Controls	Groundwater Extraction and Treatment-Option 1	Groundwater Extraction and Treatment-Option 2
Implementability	* No action is required to implement provided an annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions. * The land use restriction affects groundwater use, but allows the annex and off-base areas to remain in productive agricultural use.	* It is feasible to install groundwater extraction wells with pad-mounted liquid-phase GAC systems and conveyance piping for each well. * Coordination with regulatory agencies is required for installation of any wells and operation of the groundwater treatment system.	* It is feasible to install groundwater extraction wells with pad-mounted liquid-phase GAC systems and conveyance piping for each well. * Coordination with regulatory agencies is required for installation of any wells and operation of the groundwater treatment system.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure.	* This alternative reduces the risk of human exposure to dieldrin. However, it does not actively reduce the risk to the environment.	* This alternative is protective of both human health and the environment because groundwater is extracted and treated at all three areas of contamination. * Groundwater modeling predicts that in 50 years dieldrin concentration may be reduced below the aquifer cleanup standard (California Action Level) of 0.05 Ig/L at SWMUs 2 and 3 and SWMU 8. At the Tracy Annex, the cleanup standard will not be met in 50 years.	* This alternative is protective of both human health and the environment at the area where groundwater is extracted and treated. * Groundwater modeling predicts that in 50 years the dieldrin concentration can possibly be reduced below the aquifer cleanup standard (California Action Level) of 0.05 Ig/L at SWMUs 2 and 3. The dieldrin concentration will not be actively reduced at the DDJC-Tracy Annex or SWMU 8.

Table 7-2. (Continued)

Description of Details	Alternatives: No Further Action	Institutional Controls	Groundwater Extraction and Treatment-Option 1	Groundwater Extraction and Treatment-Option 2
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* No chemical-specific or location-specific ARARs are identified. Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection. * Spent GAC can only be stored on-site for 90 days.	* No chemical-specific or location-specific ARARs are identified. Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection. * Spent GAC can only be stored on-site for 90 days.
Estimated Cost (Present Worth)	* $9,561,600 ($49,000 for additional reviews)	* $9,601,000 ($99,000 for additional monitoring)	* $12,040,000 ($2,528,000 to address dieldrin)	* $10,909,000 ($1,396,000 to address dieldrin)

ARARS = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response Compensation, and Liability Act
GAC = Granular Activated Carbon
OU = Operable Unit
SWMU = Solid Waste Management Unit
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
Ig/L = microgram per Liter
VOC = volatile organic compound

Table 7-3. Remedial Alternatives for SWMU 1/Area 2, Area 1 Building 237, and Area 3

Description of Details	Alternatives: No Action	Institutional Controls	Soil Vapor Extraction	Excavation and Disposal
Treatment Process Description	* None.	* None.	* In situ SVE system installed in the area of highest contamination at each site. * Each SVE well has an approximately 40-foot range of influence. * Wells are screened from approximately 5 feet bgs to approximately 3 feet above the water table, * Extracted air treated by vapor phase GAC. * Treated air discharged to atmosphere.	* Soil contaminated with Vocs excavated from each site: - 30,100 yd 3 at SWMU 1/ Area 2, - 8,500 yd 3 at Area 1 Bldg. 237, - 25,200 yd 3 at Area 3. * Soil transported to a Class I off-depot disposal facility. * Clean soil imported from off-depot to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of TCE and PCE in the soil have been detected.	* None.	* None.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.

Table 7-3. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Soil Vapor Extraction	Excavation and Disposal
Implementability	* No action is required to implement provided annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is feasible to install and maintain the SVE system.	* It is feasible to excavate and landfill the contaminated soil.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to PCE and TCE.	* This alternative reduces the risk of human exposure to TCE and PCE. However, it does not actively reduce the risk to the environment (groundwater).	* This alternative is protective of human health and the environment. * It is expected that continuous operation of the SVE system for 6 months will remove the threat of VOC migration to groundwater.	* This alternative is protective of human health and the environment. * The threat of VOC migration to groundwater is removed immediately on completion of excavation.
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management, California requirements for groundwater protection, and air quality management district requirements for air emissions from GAC.	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements fur groundwater protection.
Estimated Cost (Present Worth)	* $15,000 (for each site)	* $65,000 (for each site)	* $266,000 (SWMU1/Area 2) * $140,000 (Area 1 Bldg. 237) * $242,000 (Area 3)	* $19,785,000 (SWMU 1/Area 2) * $5,607,000 (Area 1 Bldg. 237) * $16,662,000 (Area 3)

Table 7-3. (Continued)

ARARs	= Applicable or Relevant and Appropriate Requirements
bgs	= below ground surface
Cal-EPA	= California Environmental Protection Agency
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act
GAC	= Granular Activated Carbon
PCE	= tetrachloroethene
SVE	= Soil Vapor Extraction
SWMU	= Solid Waste Management Unit
TBC	= to be considered
TCE	= trichloroethene
U.S. EPA	= United States Environmental Protection Agency
VOCs	= volatile organic compounds
yd 3	= cubic yards

Table 7-4. Remedial Alternatives for SWMU 4 - Storm Drain Lagoon

Description of Details	Alternatives: No Action	Alternatives: Upstream Source Control	Alternatives: Limited Excavation and Disposal of Sediments
Treatment Process Description	* None.	* Remove sediment periodically (2,300 yd 3 every five years) from storm water conduits upstream of the storm drain lagoon. * Dewater and transport the sediment to an off-site Class I disposal facility.	* Excavate sediment contaminated with metals and pesticides. * Dewater and transport the sediment to a Class III (municipal) facility for disposal.
Containment or Storage Components	* None.	* None.	* Temporarily stockpile excavated material on-site.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal sediment, surface water, and groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.
Implementability due	* No action is required to implement provided annual groundwater moni-toring program is implemented as planned.	* This alternative is easy to implement.	* It is difficult to implement this alternative to the logistics required to drain the lagoon prior to sediment removal.
Risk Reduction	* There is no potential risk of human exposure at SWMU 4. However, this alternative does not actively reduce the potential risk posed to ecological receptors or groundwater.	* There is no potential risk of human exposure at SWMU 4. However, this alternative does not directly, imme-diately reduce the potential risk posed to ecological receptors. * This alternative prevents the potential threat to groundwater and surface water from increasing.	* This alternative is protective of human health and the environment. However, the excavation of contaminated sediment could have a much larger negative impact on the lagoon ecosystem and the aquatic biota than the ecological risks posed by the contaminants.

Table 7-4. (Continued)

Description of Details	Alternatives: No Action	Upstream Source Control	Limited Excavation and Disposal of Sediments
Risk Reduction (Continued)			* The threat posed to ecological receptors is removed by isolating the receptors from contaminants in subsurface soils.
Major ARARs and TBCs	* Federal ambient water quality criteria for protection of aquatic life is a chemical-specific ARAR for surface water. * Chemical-specific TBCs for groundwater protection were developed from Water Quality Goals (CVRWQCB, 1993). * California Fish and Game Code is a location-specific ARAR. * No action-specific ARARs are identified.	* Federal ambient water quality criteria for protection of aquatic life is a chemical-specific TBC for surface water. * Chemical-specific TBCs for groundwater protection were developed from Water Quality Goals (CVRWQCB, 1993). * California Fish and Game Code is a location-specific ARAR. * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.	* Federal ambient water quality criteria for protection of aquatic life is a chemical-specific TBC for surface water. * Chemical-specific TBCs for groundwater protection were developed from Water Quality Goals (CVRWQCB, 1993). * California Fish and Game Code is a location-specific ARAR. * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 25,000	* $ 1,158,000	* $ 552,000

ARARs = Applicable or Relevant and Appropriate Requirements
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
SVOC = semivolatile organic compound
SWMU = Solid Waste Management Unit
TBC = to be considered
yd 3 = cubic yards

Table 7-5. Remedial Alternatives for SWMU 6 - Building 28 Sump

Description of Details	Alternatives: No Action	Institutional Controls	In situ Stabilization	Excavation and Disposal
Treatment Process Description	* None.	* None.	* Mix contaminated soils with pozzolanic materials using an auger and well head system to physically and chemically immobilize pesticide contamination.	* Excavate soil contaminated with pesticides (100 yd 3) from SWMU 6. * Transport 60 yd 3 of soil to a Class I or Class II off-site disposal facility depending on the level of contamination. * Import clean soil from off site to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for area where elevated concentrations of pesticides have been detected.	* Capture vapors or dust produced during the stabilization process.	* Temporarily stockpile excavated material on-site.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.
Implementability	* No action is required to implement provided annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* This alternative is technically feasible and commercially available.	* It is feasible to excavate, transport, and landfill the contaminated soil.

Table 7-5. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	In situ Stabilization	Excavation and Disposal
Risk Reduction	* There is no potential risk to human exposure at SWMU 6, This alternative does not reduce the risk of environmental exposure to pesticides.	* There is no potential risk to human exposure at SWMU 6. This alternative does not actively reduce the risk of environmental exposure to pesticides.	* This alternative is protective of human health and the environment. * The potential threat to groundwater is significantly reduced.	* This alternative is protective of human health and the environment. * The threat of contamination migrating to groundwater is removed immediately on completion of excavation.
Major ARARs and TBCS	* Chemical-specific TBCs were developed front Water Quality Goals (CVRWQCB, 1993)	* chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993)	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993)	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993)
Estimated Cost (Present Worth)	* $ 15,000	* $ 65,000	* $ 169,000	* $ 65,000 for Class I disposal or $ 45,000 for Class II disposal

ARARs = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
SWMU = Solid Waste Management Unit
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
yd 3 = cubic yards

Table 7-6. Remedial Alternatives for SWMU 7 - Burn Pit No. 1

	Alternatives			
Description of Details	No Action	Institutional Controls	In Situ Stabilization with Institutional Controls	Excavation and Disposal with Institutional Controls
Treatment Process Description	* None.	* None.	* Mix contaminated soils with pozzolanic materials using an auger system for mixing and an injector head system to apply stabilization agents.	* Excavate 3,600 yd 3 (4,700 tons) of contaminated soil and debris. * Transport the contaminated soil to a Class I off-site disposal facility. * Import clean soil from off-site to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of VOCs, SVOCs, pesticides and herbicides, and petroleum hydrocarbons in the soil have been detected.	* Capture vapors or dust produced during the stabilization process.	* None.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Install two additional monitoring wells downgradient of the site. Monitor the two wells for OP * pesticides, OC pesticides, chlorinated herbicides, carbon/urea pesticides, and dioxins/furans semiannually for one year. * Monitor one well for SVOCs annually for four years. * Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.

Table 7-6. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	In Situ Stabilization with Institutional Controls	Excavation and Disposal with Institutional Controls
Implementability	* No action is required to implement provided annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* This is a technically feasible and commercially available technology. Materials required for implementing this alternative are readily available.	* It is feasible to excavate, transport, and landfill the contaminated soil.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to VOCs, SVOCs, pesticides and herbicides, petroleum hydrocarbons.	* This alternative reduces the risk of human exposure to VOCs, SVOCs, pesticides and herbicides, and petroleum hydrocarbons. However, it does not actively reduce the risk to the environment or groundwater.	* This alternative is protective of human health and the environment. * This alternative significantly reduces the threat posed to the groundwater.	* This alternative is protective of human health and the environment. * The potential threat of SVOC, pesticide and herbicide, and petroleum hydrocarbon migration to groundwater would be eliminated.
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.	* No chemical-specific or location-specific ARARs are identified. * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost	* $ 15,000	* $ 208,000	* $ 822,000	* $ 2,605,000

Table 7-6. (Continued)

ARARs	= Applicable or Relevant and Appropriate Requirements
Cal-EPA	= California Environmental Protection Agency
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act
OP	= organophosphorus
OC	= organochlorine
SVOCs	= semivolatile organic compounds
SWMU	= Solid Waste Management Unit
TBC	= to be considered
U.S. EPA	= United States Environmental Protection Agency
VOCS	= volatile organic compounds

Table 7-7. Remedial Alternatives for SWMU 8 - Burn Pit No. 2

Description of Details	Alternatives No Action	Institutional Controls	Bioventing	Excavation and Disposal
Treatment Process Description	* None.	* None.	* Install three air-injection well clusters to oxygenate the subsurface. * Install a pad-mounted blower adjacent to the air-injection well to supply air necessary to enhance biodegradation in the subsurface.	* Excavate 4,500 yd 3 (5,800 tons) of contaminated soil and debris. * Transport 3,400 tons of contaminated soil to a Class I off-site disposal facility. * Transport 2,400 tons of debris to a Class III off-site disposal facility. * Import clean soil from off-site to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of SVOCs, pesticides and herbicides, and petroleum hydrocarbons in the soil have been detected.	* None.	* Temporarily stockpile excavated materials on-site.
Groundwater Components	* Install a new monitoring well between the two existing monitoring wells. * Monitor the new well and the two existing wells for OC pesticides over four quarters for one year. * Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Install a new monitoring well between the two existing monitoring wells. * Monitor the new well and the two existing wells for OC pesticides over four quarters for one year. * Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted. * Groundwater monitoring is included in Well Monitoring Program.	* Install one new monitoring well between the two existing monitoring wells. * Monitor the new well and the two existing wells for OC pesticides over four quarters for one year. * Groundwater monitoring is included in Well Monitoring Program.	* Install one new monitoring well between the two existing monitoring wells. * Monitor the new well and the two existing wells for OC pesticides over four quarters for one year. * Groundwater monitoring is included in Well Monitoring Program.

Table 7-7. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Bioventing	Excavation and Disposal
Implementability	* No action is required to implement provided annual groundwater monitoring program is implemented as planned. * New monitoring wells can be easily installed.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is feasible to install and maintain the bioventing system. However, air-injection wells may be difficult to install and operate due to construction debris.	* Excavate may be difficult at SWMU 8 due to construction debris. The debris must be separated from the contaminated soil before disposal.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to SVOCS, pesticides and herbicides, or petroleum hydrocarbons. * Additional monitoring will help clarify actual exposure potential and risk to groundwater.	* This alternative reduces the risk of human exposure to SVOCs, pesticides and herbicides, and petroleum hydrocarbons. However, it does not actively reduce the risk to the environment. * Additional monitoring will help clarify actual exposure potential and risk to groundwater.	* This alternative is protective of human health and the environment. * The petroleum hydrocarbons and SVOCs should be reduced below the cleanup standard in two years. * This alternative does not reduce the threat posed to the groundwater by pesticides in the soil.	* This alternative is protective of human health and the environment. * The potential threat of SVOC, pesticide and herbicide, and petroleum hydrocarbon migration to groundwater would be eliminated.
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 15,000	* $65,000	* $246,000	* $2,823,000

ARARs = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
OC = organochlorine
SWMU = Solid Waste Management Unit
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
SVOCS = semivolatile organic compounds
yd 3 = cubic yards

Table 7-8. Remedial Alternatives for SWMU 20 - Aboveground Solvent Tank/Building 26 Recoup Operations and Area 1 Building 10

Description of Details	Alternatives: No Action	Institutional Controls	SVE, Excavation and Disposal, and Natural Attenuation	Excavation and Disposal
Treatment Process Description	* None.	* None.	* Excavate the contaminated soil (250 yd 3) from SWMU 20, * Transport soil to a Class I off-site disposal facility. * Import clean soil from off-site to backfill the excavated areas. * Install in situ SVE system in the vicinity of SB 108 at Area 1 Building 10 and SB431 to reduce TCE concentrations below cleanup standard. * Soil contaminated with 2,4,6-trichlorophenol is expected to naturally attenuate before it reaches groundwater.	* Excavate soil (500 yd 3) contaminated with VOCs, SVOCs, pesticides, and petroleum hydrocarbons from SWMU 20 and Area 1 Building 10. * Transport soil to a Class I off-site disposal facility. * Import clean soil from off-site to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of contaminants in the soil have been detected.	* None.	* Temporarily stockpile excavated materials on-site.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.

Table 7-8. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	SVE, Excavation and Disposal, and Natural Attenuation	Excavation and Disposal
Implementability	* No action is required to implement provided annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is feasible to install and maintain the SVE system. * It is feasible to excavate, transport, and dispose of the contaminated soil.	* It is feasible to excavate, transport, and dispose of the contaminated soil.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to VOCs, SVOCs, and pesticides and herbicides.	* This alternative reduces the risk of human exposure to VOCs, SVOCs, and pesticides and herbicides. However, it does not reduce the risk to the environment.	* This alternative is protective of human health and the environment. * The threat of contaminant migration to groundwater would be eliminated.	* This alternative is protective of human health and the environment. * The threat of contaminant migration to groundwater would be removed immediately on completion of excavation.
Major ARARs and TBCs	Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management, California requirements for groundwater protection, and AQMD requirements for air discharges from the SVE system.	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 15,000	* $65,000	* $ 293,000	* $355,000

ARARS = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
SVE = Soil Vapor Extraction
SVOCS = semivolatile organic compounds
SWMU = Solid Waste Management Unit
TBC = to be considered
TCE = trichloroethene
U.S. EPA = United States Environmental Protection Agency
VOCS = volatile organic compounds

Table 7-9. Remedial Alternatives for SWMU 24 - Building 247 Petroleum Laboratory Waste Oil Tank

Description of Details	Alternatives				
	No Action	Institutional Controls	Bioventing	Excavation and Disposal	Excavation and On-Site Bioremediation
Treatment Process Description	* None.	* None.	* Install an air-injection well and a pad-mounted blower system. * The well should be screened from 6 feet bgs to 16 feet bgs.	* Excavate 240 cubic yards (320 tons) of contaminated soil and debris. * Transport the contaminated soil to a Class I off-site disposal facility. * Import clean soil from off site to backfill the excavated areas.	* Excavate the soil with contaminant levels above cleanup standards. * Treat the soil aboveground using on-site bioremediation, such as landfarming, slurry-phase reactors, composting, or biopiles. The actual remediation process chosen to remediate this site will be determined during the remedial design phase. * The treated soil will be backfilled at the site.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of contaminants in the soil have been detected.	* None.	* None.	* None.

Table 7-9. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Bioventing	Excavation and Disposal	Excavation and On-Site Bioremediation
Groundwater Components	* Monitor well LM118AA for TPH as gasoline and TPH as diesel quarterly for three quarters. * Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted. Analytical data will be reviewed to assess the potential threat to groundwater contamination.	* Monitor well LM118AA for TPH as gasoline and TPH as diesel quarterly for basis for three quarters. * Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sample will be conducted. Analytical data will be reviewed to assess the potential threat to groundwater contamination.	* Monitor well LM118AA for TPH as gasoline and TPH as diesel quarterly for three quarters. * Groundwater monitoring is included in Well Monitoring Program.	* Monitor well LM118AA for TPH as gasoline and TPH as diesel on a quarterly basis for three quarters. * Groundwater monitoring is included in Well Monitoring Program.	* Monitor well LM118AA for TPH as gasoline and TPH as diesel quarterly for three quarters. * Groundwater monitoring is included in Well Monitoring Program.
Implementability	* There are no implementation issues.	* Cooperation is required among the Army, U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is feasible to install and maintain the bioventing system.	* Excavation of soil beneath Building 247 may be difficult due to excavation depth of 17 feet.	* Excavation of soil beneath Building 247 may be difficult due to excavation depth of 17 feet.

Table 7-9. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Bioventing	Excavation and Disposal	Excavation and On-Site Bioremediation
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to contaminants.	* This alternative reduces the risk of human exposure to contaminants, but does not reduce the risk to groundwater.	* This alternative is protective of human health and the environment. * The VOCs, SVOCs, and petroleum hydrocarbons are reduced below the cleanup standard in two years. * This alternative permanently reduces the threat posed to the groundwater by biodegrading the primary soil contaminants (VOCs, SVOCs, and petroleum hydrocarbons). Although PCBs and pesticides are present in the soil at SWMU 24, posed by these compounds is considered low.	* This alternative is protective of human health and the environment. * The potential threat of contaminant migration to groundwater would be eliminated.	* This alternative is protective of human health and the environment. * The potential threat of contaminant migration to groundwater would be eliminated.

Table 7-9. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Bioventing	Excavation and Disposal	Excavation and On-Site Bioremediation
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waster management and California requirements for groundwater protection.	D Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). D Action-specific ARARs include California and federal requirements for hazardous waster management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 15,000	* $ 65,000	* $ 166,000	* $ 214,000	* $263,000

ARARs = Applicable or Relevant and Appropriate Requirements
bgs = below ground surface
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
PCB = polychlorinated biphenyl
SVOCs = semivolatile organic compounds
SWMU = Solid Waste Management Unit
TBC = to be considered
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
U.S. EPA = United States Environmental Protection Agency
VOCs = volatile organic compounds

Table 7-10. Remedial Alternatives for SWMU 27 - Building 206 Roundhouse Sump/Area 1 Building 206

Description of Details	Alternatives: No Action	Alternatives: Institutional Controls	Alternatives: Excavation and Disposal
Treatment Process Description	* None.	* None.	* Excavate soil contaminated to 16 feet bgs around the sump and to 5 feet bgs in the other areas based on the nature and extent of contamination. * Transport 130 yd 3 (170 tons) of contaminated soil and concrete to a Class I off-site disposal facility. * Import clean soil from off-depot to backfill the excavate areas.
Containment or Storage Components	* None.	* Impose land use restrictions for area where elevated concentrations of VOCs, SVOCs, and PCBs in the soil have been detected.	* None.
Groundwater Components	* Groundwater monitoring is included in Annual Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Annual Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Annual Well Monitoring Program.
Implementability	* No action is required to implement provided annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is feasible to excavate, transport, and dispose of the contaminated soil.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to VOCs, SVOCs, and PCBs.	* This alternative reduces the risk of human exposure to VOCs, SVOCs, and PCBs. However, it does not actively reduce the risk to environment.	* This alternative is protective of human health and the environment. * The threat of contaminant migration to groundwater is removed immediately on completion of the excavation.

Table 7-10. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Excavation and Disposal
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 15,000	* $ 65,000	* $ 112,000

ARARs = Applicable or Relevant and Appropriate Requirements
bgs = below ground surface
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
PCBs = polychlorinated biphenyls
SVOCs = semivolatile organic compounds
SWMU = Solid Waste Management Unit
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
VOCs = volatile organic compounds
yd 3 = cubic yards

Table 7-11. Remedial Alternatives for Building 30 Drum Storage Area

Description of Details	Alternatives: No Action	Alternatives: Institutional Controls	Alternatives: Excavation and Disposal
Treatment Process Description	* None.	* None.	* Excavate contaminated soil to 18 feet bgs. * Transport 2,800 yd 3 (3,600 tons) of contaminated soil to a Class I or Class II off-site disposal facility based on the level of contamination. * Import clean soil from off-depot to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for area where elevated concentrations of benzyl alcohol and phthalates in the soil have been detected.	* None.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Install a monitoring well downgradient of the Building 30 Drum Storage Area. * Monitoring quarterly for one year for SVOCs. * Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.
Implementability	* Site reviews are very easy to implement.	* Cooperation is required among the Army the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is feasible to excavate, transport, and dispose of the contaminated soil.
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to benzyl alcohol and phthalates.	* This alternative reduces the risk of human exposure to benzyl alcohol and phthalates. However, it does not actively reduce the risk to the environment.	* This alternative is protective of human health and the environment. * The threat of contaminant migration to groundwater is removed immediately on completion of the excavation.

Table 7-11. (Continued)

Description of Details	Alternatives		
	No Action	Institutional Controls	Excavation and Disposal
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 10,000	* $ 87,000	* $ 907,000 (Class II disposal), or $ 1,860,000 (Class I disposal)

ARARs = Applicable or Relevant and Appropriate Requirements
bgs = below ground surface
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
SVOCs = semivolatile organic compounds
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
yd 3 = cubic yards

Table 7-12. Remedial Alternatives for Surface and Near-Surface Soil - Northern Depot Area

Description of Details	Alternatives: No Action	Institutional Controls	Asphalt Cover	Excavation and Disposal
Treatment Process Description	* None.	* None.	* None.	* Excavate 3,000 yd 3 (4,000 tons)of soil containing elevated levels of arsenic and manganese. * Transport the contaminated soil to a Class II or Class III off-site disposal facility depending on the level of contamination.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentrations of contaminants in the soil have been detected.	* Install an asphalt cover over the soils with elevated levels of arsenic and manganese.	* None.
Groundwater Components	* Per CERCLA guidance, five-year reviews will be conducted.	* Per CERCLA guidance, five-year reviews will be conducted.	* Per CERCLA guidance five-year reviews will be conducted.	* Per CERCLA guidance five-year reviews will be conducted.
Implementability	* Site reviews are very easy to implement. * No action is required to implement provided annual groundwater monitoring program is implemented as planned.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* It is easy to implement this alternative.	* Excavation, transportation, and disposal of soil are easily implementable.

Table 7-12. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Asphalt Cover	Excavation and Disposal
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to contaminants.	* This alternative reduces the risk of human exposure to arsenic and manganese. However, it does not actively reduce the risk to the environment. * This alternative is protective of human health under current and future land use conditions.	* An asphalt cover provides a reliable barrier and reduces the exposure to soil contaminants via dermal contact, ingestion, and/or inhalation. * The risk to the environment will not be actively reduced; however the asphalt cap may reduce potential transport of contaminants to the groundwater.	* This alternative is protective of human health and the environment. * The threat of contaminant migration to groundwater is removed immediately on completion of the excavation.
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $15,000	* $ 17,000	* $504,000	* $995,000 (Class II disposal), or $769,000 (Class III disposal)

ARARs = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
Yd 3 = cubic yards

Table 7-13. Remedial Alternatives for SWMUs 2 and 3

Description of Details	Alternatives: No Action	Institutional Controls	Excavation and Disposal
Treatment Process Description	* None.	* None.	* Excavate soil above cleanup standards identified to protect groundwater quality. - 10,000 yd^3 estimated to be removed. * Transport soil to a Class III off-depot disposal facility. * Import clean soil from off-depot to backfill the excavated areas. * Install geofabric filter and apply additional clean backfill to protect ecological receptors.
Containment or Storage Components	* None.	* Impose land use restrictions for areas around the lagoons.	* None.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. Per CERCLA guidance, five-year reviews involving minimal soil and groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal soil and groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.
Implementability	* Site reviews are very easy to implement. * No action is required to implement provided annual groundwater monitoring program is implemented as planned	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* Difficult to implement because of the large volume of soil/sediment to be excavated. * Excavation will disrupt DDJC-Tracy operations as the lagoons would not be available for discharge of effluent from the nearby sewage treatment plant.

Table 7-13. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Excavation and Disposal
Risk Reduction	* This alternative does not reduce the risk of human or environmental exposure to dieldrin, DDD, DDE, DDT, di-n-butylphthalate, and bis(2-ethylbexyl)phthalate.	* This alternative reduces the risk of human exposure to dieldrin, DDD, DDE, DDT, di-n-butylphthalate, and bis(2-ethylhexyl)phthaiate. However, it does not actively reduce the risk to the environment.	* This alternative is protective of human health and the environment. * The threat of contamination migrating to groundwater is removed immediately on completion of excavation. * Risks to ecological receptors are mitigated by isolating receptors from exposure to contaminants.
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $15,000	* $65,000	* $2,100,000

ARARs = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
EE/CA = Engineering Evaluation/Cost Analysis
SWMU = Solid Waste Management Unit
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
yd 3 = cubic yards

Table 7-14. Remedial Alternatives for SWMU 33

Description of Details	Alternatives: No Action	Institutional Controls	Excavation, Grouting, Institutional Controls	Excavation
Treatment Process Description	* None.	* None.	* Excavate approximately 200 yd 3 of soil at SB464,SB462, and SB204	* Excavate the entire IWPL and surrounding soil where aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate concentrations are above the revised soil cleanup standards. - 6,700 yd 3 estimated to be removed. - Depth of excavation 15 feet bgs and 3 feet on each side of the pipeline along the entire IWPL. * Transport soil to a Class I off-depot disposal facility. * Import clean soil from off-depot to backfill the excavated areas.
Containment or Storage Components	* None.	* Impose land use restrictions for areas where elevated concentration of aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate have been detected.	* Pressure grout manholes and laterals to eliminate discharges.	* None.
Groundwater Components	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal soil and groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program. * Per CERCLA guidance, five-year reviews involving minimal soil and groundwater sampling will be conducted.	* Groundwater monitoring is included in Well Monitoring Program.	* Groundwater monitoring is included in Well Monitoring Program.

Table 7-14. (Continued)

Description of Details	Alternatives: No Action	Institutional Controls	Excavation, Grouting, Institutional Controls	Excavation
Implementability	* Site reviews are very easy to implement.	* Cooperation is required among the Army, the U.S. EPA, San Joaquin County, and Cal-EPA to enact the land use restrictions.	* Excavation and grouting are implementable.	* Difficult to implement excavation because of utilities and building in the area and the required excavation depth at same location. * Excavation will disrupt DDJC-Tracy operations.
Risk Reduction	* This alternative does not reduce the risk of environmental exposure to aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate.	* This alternative reduces the risk of environmental exposure to aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate. However, it does not actively reduce the risk to the environment.	* Contaminants would be removed or contained. * Groundwater monitoring required to ensure any future impacts are addressed.	* This alternative is protective of human health and the environment. * The threat of contamination migrating to groundwater is removed immediately on completion of excavation. * Revised FS cleanup standards for aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate are met.
Major ARARs and TBCs	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993).	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.	* Chemical-specific TBCs were developed from Water Quality Goals (CVRWQCB, 1993). * Action-specific ARARs include California and federal requirements for hazardous waste management and California requirements for groundwater protection.
Estimated Cost (Present Worth)	* $ 15,000	* $ 65,000	* $ 242,600	* $ 4,708,000

ARARS = Applicable or Relevant and Appropriate Requirements
Cal-EPA = California Environmental Protection Agency
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
FS = Feasibility Study
IWPL = Industrial Waste Pipeline
SWMU = Solid Waste Management Unit
TBC = to be considered
U.S. EPA = United States Environmental Protection Agency
yd 3 = cubic yards

Table 7-15. No Further Action Sites

SWMU Number/Site	Description	Comments
SWMU 5	Old Industrial Lagoon	VOCs, SVOCs, pesticides, petroleum hydrocarbons and metals have not been released to the soil from disposal activities. Additionally, the Phase I WQSA showed that concentrations of metals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater at SWMU 5. Low concentrations of TCE are present in groundwater downgradient of SWMU 5, but the concentrations of TCE are consistent with concentration detected in this area of the OU 1 groundwater plume.
SWMU 9	Subsistence Waste Pit	No evidence of any buried disposal pit has been found. Metals were detected in site soils at concentrations that slightly exceeded background thresholds. However, the Phase I WQSA showed that concentrations of methals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater. Samples from monitoring wells adjacent to SWMU 9 do not indicate any groundwater contamination associated with the site. Very little information is available concerning disposal activities at SWMU 9, and it is possible that the suspected subsistence waste pit reported at this site may instead be the disposal area identified at SWMU 8.
SWMU 10	Medical Waste Burial Pit	There has not been a release of contaminants associated with SWMU 10 to soil or groundwater. No evidence of any subsurface disposal feature was found. No evidence of disposal or backfilling was observed during trenching and soil boring activities. The Phase I and Phase II WQSA showed that concentrations of metals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater.
SWMU 10A	Possible Medical Waste Burial Pit	SWMU 10A is recommended for no further action because there is no adverse human health risk posed by COPCs in site soils and the COPCs that have been released to site soils (bis[2-ethylhexyl]phthalate, dieldrin, and metals) were seldom detected in soil samples and have not been detected in groundwater above background levels.
SWMU 11	Lime/Foot Bath Burial	No disposal activities have been identified at SWMU 11. Additionally, no potential source of soil or groundwater contamination has been identified at this site.
SWMU 12	Embalming Fluid Dump	No contaminants have been released to the soil or groundwater from the disposal activities associated with SWMU 12. None of the soil and groundwater samples had detectable concentrations of formaldehyde or methanol. The Phase I WQSA showed that concentrations of metals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater at SWMU 12. COPCs at SWMU 12 pose a cancer risk below 1x10 -6 and a hazard index of less than 1 for the construction worker.

Table 7-15. (Continued)

SWMU Number/Site	Description	Comments
SWMU 14	Lube Oil Dump	SVOCs, pesticides, petroleum hydrocarbons, and metals have been released to vadose zone soils at SWMU 14. Groundwater has not been impacted by activities at SWMU 14. COPCs at SWMU 14 do not pose a threat to background groundwater quality based on the WQSA and analytical modeling. COPCs at SWMU 14 result in a cancer risk that is below 1x10 -6 and a hazard index of less than 1 for the construction worker.
SWMU 15	Pesticide Waste Trench	There has not been a release of contaminants from the former pesticide waste trench to the soil and groundwater. During drilling activities, no subsurface evidence of a disposal area was identified. The presence of DDT in one soil sample at a low concentration is most likely related to a minor isolated spill or chronic use of these chemicals in the vicinity of DDJC-Tracy, and is not interpreted as indicative of a single identifiable contaminant source. The isolated occurrence of metals detected above background is not indicative of an identifiable contamination source. The presence of two metals in one sample at concentrations only slightly exceeding background may be related to the inherent natural variability in the environment. The results of the Phase I WQSA showed that concentrations of metals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater. Based on the results of the analytical modeling, the constituents detected in site soils at SWMU 15 do not pose a threat to groundwater.
SWMU 16	Possible Hazardous Waste Storage	There was no evidence of a disposal area at SWMU 16 based on the results of the Phase I RI sampling and field observations made during drilling. Metals were detected at concentrations only slightly greater than DDJC-Tracy background levels in deep soil samples collected at SWMU 16. Beryllium was the only metal detected in deep soil samples at a concentration greater than two times its background threshold value. The low levels of metals exceeding DDJC-Tracy background levels may be related to the inherent natural variability in the environment, specifically, the presence of expansive clays at depth beneath the site. All detected concentrations are less than the range of background values compiled for California and the San Joaquin Valley. The low levels of OC pesticides, dioxins, and radionuclides are limited in occurrence and are also interpreted to represent natural conditions at DDJC-Tracy. The WQSA and analytical modeling performed for SWMU 16 indicate that constituents detected in site soils do not pose a threat to groundwater. COPCs at SWMU 16 most likely result in a cancer risk that is below 1x10 -6 and a hazard index of less than 1 for the construction worker.

Table 7-15. (Continued)

SWMU Number/Site	Description	Comments
SWMU 21	Battery Acid Dump	No contaminants have been released to the soil and groundwater from the battery shop activities at SWMU 21. The isolated detection of beryllium in soil at a concentration only slightly above the background reference levels is attributed to the natural variability in the environment. Although total barium and iron were detected at concentrations slightly above background in groundwater, these metals were not detected in site soils above background levels. It was determined that beryllium does not have the potential to reach the groundwater within 100 years.
SWMU 22	Previous Hazardous Material Storage Area	There has been no release of contaminants to the soil from disposal activities associated with SWMU 22. There are no historical data to suggest that metal-containing wastes were stored at this site, and the low concentrations of COPCs (beryllium, chromium, and molybdenum) detected are not distributed in any identifiable spatial pattern that would be indicative of an anthropogenic source. Additionally, these three metals have not been detected above background in four quarters of groundwater monitoring from downgradient monitoring wells. Low levels of TCE and metals (copper and manganese) have been inconsistently detected in groundwater samples collected at SWMU 22; however, these constituents may be attributed to another source (SWMU 8), because these compounds were not detected in soil above the background threshold at SWMU 22.
SWMU 23	Building 26 Recoup Operations	low levels of contaminants were detected in sludge from SL001. None of the contaminants were present above concentrations that would impact human health, ecological receptors, or groundwater quality. The sludge has been removed. Tile floor drain connects into the industrial wastewater pipeline (IWPL) and contamination in tile IWPL is being addressed under SWMU 20 and SWMU 33.
SWMU 25	Boundary Roads	There has not been a release of contaminants associated with SWMU 25 dust control CD activities to site soils. OC pesticides were not detected above background threshold levels and petroleum hydrocarbons in the form of TPHD and TPHG were not detected. In addition, the results of the Phase I WQSA showed that concentrations of metals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater at SWMU 25.
SWMU 29	Used Motor Oil Disposal Pit	No potential source of soil and groundwater contamination was identified at SWMU 29 No other evidence indicates the presence or location of the used motor oil pit. Because no evidence of any disposal area or contamination was found within SWMU 29, there are no known risks associated directly with the site.

Table 7-15. (Continued)

SWMU Number/Site	Description	Comments
SWMU 30	Salvage Area	Low levels of VOCs were detected in soil-gas samples, however, no spatial pattern of distribution was observed, and the presence of VOCs was not confirmed by soil samples collected at SWMU 30. Isolated low concentration of PAHs and phenols were detected in soil samples. Based on all analytical data collected at the site, no release of contamination has occurred at SWMU 30. The results of the Phase I WQSA showed that concentrations of metals in site soils do not pose a threat to background water quality or beneficial uses of ground water at SWMU 30. Phenols and benzene pose a potential threat to groundwater at SWMU 30 based on the results of the analytical model. However these constituents are not considered a threat to groundwater because detections of phenols are not considered representative of current site conditions and benzene was not detected in site soil samples. COPCs at SWMU 30 do not contribute to the human health risk calculated for the exposure unit associated with this site.
SWMU 31	Wood Preservation Area	No contaminants have been released to the soil and groundwater from the wood preservation activities at SWMU 31. The occurrence of isolated concentrations of nickel, manganese, and barium at levels only slightly above the background reference levels in two of four samples from one soil boring location are attributed to the natural variability in the environment or minor spills. The results of the Phase I WQSA showed that concentrations of metals in site soils do not pose a possible threat to background water quality or beneficial uses of groundwater at SWMU 31.
SWMU 64	Waste Oil Pit	The isolated occurrence of metals detected above background is not indicative of a identifiable contaminant source. The presence of metals at concentrations only slightly exceeding background may be related to the inherent variability of background concentrations expected under naturally occurring conditions. Metals were not consistently detected in the six quarters of groundwater samples. Based on tile results of the Phase I RI activities, no contaminants have been released to the soil and groundwater from the former storage tank at SWMU 64.
Area 1 Building 236	Past Solvent Storage and Use	There has not been a release of contaminants associated with solvent storage activities at Area I Building 236. Although methylene chloride was detected in site soils during previous investigations, the results of the Phase I investigation did not confirm the presence of methylene chloride contamination in the soil at Building 236. In addition, 23 soil borings were drilled during investigations near Building 236 and methylene chloride contamination in soil was not found. There has not been a release of contaminants to the subsurface in association with drum storage in this area.

Table 7-15. (Continued)

SWMU Number/Site	Description	Comments
Drum Storage Area Building 15	Drum Storage Area	No VOC or SVOC constituents were detected in any of the soil samples collected in the vicinity of Building 15. Because no chemicals were detected in soil samples from the Drum Storage Area Building 15, there are no known risks associated with this site.
Drum Storage Area Building 22	Drum Storage Area	There has not been a release of contaminants associated with drum storage at Building 22. VOCs were not detected above the reporting limits in soil samples. Phthalate compounds were detected sporadically, and were attributed to field or laboratory related contamination. VOC contamination in nearby wells is believed to be related to disposal activities at other sites. The results of the analytical modeling indicated that bis(2-ethylhexyl) phthalate posed a threat to groundwater; however, recharge at the site was not sufficient to mobilize di-n-butyl phthalate to groundwater. Numerical modeling results from other sites which had similar site conditions and concentrations of phthalates were applied to Drum Storage Area Building 22, to further evaluate contaminant fate and transport. Based on this final assessment, bis(2-ethylhexyl)phthalate does not pose a threat to groundwater at Drum Storage Area Building 22.
Building 23	Storage Areas	There has not been a release of contaminants at Building 23. VOCs were not detected ill soil samples above the reporting limit. A phthalate compound was detected in one sample, but was attributed to laboratory-related contamination. COPCs at Building 23 result in a cancer risk that is below 1 X 10 -6 and a hazard index of less than 1 for the construction worker.
Day Care Center		PAHs, pesticides, and lead were present in site soils as a result of nearby operations or vehicular emissions in the vicinity of the Day Care Center. COPCs at the Day Care Center posed a cancer risk that was greater than 1 x 10 -6 and a hazard index that was less than 1 for children. Additional soil sampling was performed by Radian on August 31, 1995 in support of the corrective action proposed for the Day Care Center. The results of this investigation confirmed the results of the Phase 11 investigation conducted by Montgomery Watson in 1994. The corrective action was performed by Davy International in September and October 1995. All soil within the lawn areas was excavated to a depth of 1 foot. Approximately 9 inches of clean fill were placed and compacted, and then a 3-inch soil cover was laid down. The corrective action resulted in a reduction of the incremental cancer risks associated with the Day Care Center to zero by removing the highest concentrations of pesticides, PAHs, and metals and eliminating the potential for contact with contaminated surface soil.

SWMU=Solid Waste Management Unit

8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

8.1 Background

8.1.1 The nine National Contingency Plan (NCP) evaluation criteria were developed to provide decision makers with sufficient information to adequately compare the remedial alternatives for a site and to select an appropriate remedy. These criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The threshold criteria must be met for an alterative to be eligible for selection. The balancing criteria are used to compare the relative strengths and weaknesses of the different alternatives. The modifying criteria are taken into account after public and regulatory comments are received. The NCP evaluation criteria are summarized in Table 8-1.

8.1.2 In the Feasibility Study (FS), the remedial alternatives presented for each site, or group of sites, were evaluated using the following seven NCP criteria:

- Overall protection of human health and the environment;
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, and volume through treatment;
- Short-term effectiveness;
- Implementability; and
- Cost.

8.1.3 Two additional NCP criteria, state acceptance and community acceptance, are addressed based on comments received on the final RI/FS report and the Proposed Plan. State acceptance has also been addressed by incorporating state comments on the draft ROD into the final ROD. During the public comment period for the Proposed Plan, only one written public comment was received (see Responsiveness Summary).

8.1.4 In this section, the remedial alternatives presented for each site (or group of sites) are compared with each other in regard to all nine criteria to highlight their relative strengths and weaknesses (see Table 8-2). For all sites, the No Action (or No Further Action) alternative is evaluated to provide a baseline for comparison with the other remedial alternatives. Five-year reviews are typically part of the No Action alternative, as contaminants will remain on site. Institutional Controls, which include land use restrictions, restrictive covenants, and/or fencing, are also part of each comparative evaluation.

8.1.5 Per Section 6.5, the potential future resident scenario was not considered in the evaluation of the protection of human health because this scenario is highly unlikely.

8.2 Analysis of Remedial Alternatives for OU 1 Groundwater

8.2.1 Remedial Alternatives

8.2.1.1 This ROD modifies the selected remedy for Operable Unit (OU) 1 groundwater (WCC, 1993) to address dieldrin. The selection of the remedy for OU 1 groundwater is discussed in Section 7.3. As noted in Section 7.3 and Table 7-1, no additional contaminants of concern other than dieldrin were identified for OU 1 groundwater. The remedy selected in the OU 1 ROD addressed TCE, PCE, and 1,1-DCE. The remedy included groundwater extraction, treatment, and injection. The location and number of extraction wells has been optimized in the design process and new wells are included in the alternatives to address dieldrin. Treatment by air stripping remains appropriate for VOCs (no non-aqueous phase contamination has been encountered and no VOC concentrations have been encountered that exceed the design capabilities of the air stripping systems), but is not adequate to address pesticides in groundwater. Therefore, the selected remedy was reevaluated and modified in the OU 1 ESD (Montgomery Watson, 1996g) to include well-head treatment to remove pesticides. No metals or other contaminants have been identified in the

RI/FS (see Table 7-1) or operation of the interim groundwater treatment system that require treatment to meet discharge requirements. Injection remains the preferred method of discharge, although infiltration galleries have proven more effective than injection wells. The capture of the VOC plume was also reevaluated in the OU 1 ESD (Montgomery Watson, 1996g) and the selected remedy was modified to include dispersion of TCE and PCE east of Banta Road. Four modifications of the selected remedial alternative were developed for dieldrin in OU 1 groundwater. They are:

Alternative 1 - No Further Action
Alternative 2 - Institutional Controls
Alternative 3 - Groundwater Extraction and Treatment
Alternative 4 - Groundwater Extraction and Treatment Option 2

8.2.1.2 Alternative 1 provides a baseline for comparison with other alternatives. It includes existing extraction, treatment, and injection to address VOCs in groundwater; five-year site reviews; and long-term groundwater monitoring. Alternative 2 includes the components of Alternative 1 as well as land use restrictions in the areas where elevated levels of dieldrin in groundwater have been detected.

8.2.1.3 Future water rights restrictions would be written into the land property deed as necessary if ownership of the depot were transferred to private or non-DoD entities. Alternative 3 consists of groundwater "extraction and treatment with liquid-phase granular activated carbon (GAC in all three areas of dieldrin-contaminated groundwater (near solid waste management units [SWMUs] 2, 3, and 8). Alternative 4 consists of groundwater extraction and treatment with GAC in the vicinity of SWMUs 2 and 3. The contaminated ground-water near SWMU 8 would not be treated under this alternative.

8.2.2 Overall Protection of Human Health and the Environment

The off-depot groundwater risk to residents is estimated at lxl0 -5 and the hazard index is estimated at 0.9. These risks are associated with exposure to VOCs. Future risks to depot workers were estimated at 2x10 -2 in the unlikely event that a drinking water well is installed in the contaminant plume. Alternative 1 (No Further Action) does not address the human health risks associated with dieldrin for the future depot worker. Institutional Controls provided in Alternative 2, reduce the potential for direct contact with contaminated groundwater for both current and future land use conditions. Alternative 3 (Groundwater Extraction and Treatment Option 1) provides greater overall protection of human health and the environment than Alternative 2 because groundwater is extracted and treated in all three areas of dieldrin contamination. Alternative 4 (Groundwater Extraction and Treatment Option 2) provides more overall protection than Alternative 2 but less than Alternative 3 because groundwater near SWMU 8 would not be treated.

8.2.3 Compliance with ARARs

There is a California Action Level of 0.05 micrograms per liter (Ig/L) for dieldrin in groundwater, which is a chemical-specific TBC (to be considered). This TBC would be met by Alternative 3 (Groundwater Extraction and Treatment Option 1) only. The ARARs concerning groundwater protection (27 CCR Division 2, Subdivision 1 et seq., SWRCB Resolution No. 68-16, and SWRCB Resolution No. 92-49) apply to all alternatives but are only be met by Alternative 3 (Groundwater Extraction and Treatment Option 1). The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) only apply to Alternatives 3 and 4 (Groundwater Extraction and Treatment Option 2). All hazardous wastes generated are managed in compliance with these ARARs.

8.2.4 Long-Term Effectiveness

Alternatives 1 (No Further Action) and 2 (Institutional Controls) are not protective of human health and the environment, as dieldrin contamination in groundwater remains. Alternative 3 (Groundwater Extraction and Treatment Option 1) provides long-term effectiveness and permanence by using ground-water extraction and treatment to reduce dieldrin concentrations to below the California Action Level of 0.05 Ig/L. However, treatment would take approximately 50 years to achieve this level. Alternative 4 (Groundwater Extraction and Treatment Option 2) is similar to Alternative 3 for the areas near SWMUs 2 and 3; however, the groundwater near SWMU 8 would not be treated so the action level may not be met in that area.

8.2.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Further Action) and 2 (Institutional Controls) do not actively reduce the toxicity, mobility, or volume of dieldrin in groundwater at OU 1. Alternatives 3 (Groundwater Extraction and Treatment Option 1) and 4 (Groundwater Extraction and Treatment Option 2) remove dieldrin from the groundwater and treat it, thereby reducing the toxicity, mobility, and volume of this constituent. Alternative 4 results in less reduction than Alternative 3, as the contaminated groundwater near SWMU 8 will not be treated in Alternative 4.

8.2.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Further Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (Groundwater Extraction and Treatment Option 1) and 4 (Groundwater Extraction and Treatment Option 2), remedial workers could be exposed to contaminated soils during drilling to install extraction wells and/or during the operation of the groundwater treatment systems. However, dust control and protective measures could be taken to minimize these risks. Remedial activities would continue for approximately 50 years.

8.2.7 Implementability

There is no action associated with Alternative 1 (No Further Action). The land use restrictions in Alternative 2 (Institutional Controls) are easily implementable. Alternatives 3 (Groundwater Extraction and Treatment Option 1) and 4 (Groundwater Extraction and Treatment Option 2) are also readily implementable. Conventional drilling equipment can be used to install extraction wells because the wells would be less than 50 feet deep. Few difficulties are expected during construction and operation of the groundwater extraction and treatment systems. GAC treatment of groundwater that contains pesticides/VOCs containing groundwater is well understood and has been implemented at other sites.

8.2.8 Cost

The estimated present worth for Alternative 1 (No Further Action, $9,561,000), Alternative 2 (Institutional Controls, $9,611,000), and Alternative 3 (Groundwater Extraction and Treatment Option 1, $12,040,000) increases successively due to the subsequent addition of component technologies. The present worth of Alternative 4 (Groundwater Extraction and Treatment Option 2, $10,909,000) is lower than for Alternative 3 because less dieldrin-contaminated groundwater is remediated in Alternative 4.

8.2.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Further Action), 2 (Institutional Controls) or 4 (Groundwater Extraction and Treatment Option 2) because of the potential health threats associated with dieldrin to potential future residents of the annex. Alternative 3 (Groundwater Extraction and Treatment Option 1) is protective of human health and the environment because pesticides are removed from the groundwater and the treated groundwater is returned to the aquifer for future use. Therefore, state and community acceptance of Alternative 3 is anticipated. One written public comment addressing the capacity of the reinjection wells and the cost of the groundwater treatment was received (see Responsiveness Summary).

8.3 Analysis of Remedial Alternatives for the Group A Sites

8.3.1 Remedial Alternatives

8.3.1.1 The Group A sites (SWMU 1/Area 2, Area 1 Building 237, and Area 3) are characterized by tetrachloroethene (PCE) and trichloroethene (TCE) contamination in soil. The remedial alternatives developed for the Group A sites are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Soil Vapor Extraction
Alternative 4 - Excavation and Disposal

8.3.1.2 Alternative 1 includes five-year site reviews and long-term monitoring. Alternative 2 includes the components of Alternative 1, plus land use restrictions around areas where elevated concentrations of volatile organic compounds (VOCs) have been detected at the Group A sites. Restrictive land use covenants can be written into the property deed if ownership of the installation were transferred to private or non-federal agencies in the future. Alternative 3 treats VOC-contaminated soil in situ by installing a soil vapor extraction (SVE) system in the area of highest contamination at each Group A site. Alternative 4 involves excavating approximately 63,800 cubic yards of VOC contaminated soil at the Group A sites and disposing of the soil off site.

8.3.2 Overall Protection of Human Health and the Environment

If polycyclic aromatic hydrocarbons are substantially more carcinogenic via dermal than via oral exposure, the cancer risk for the current depot worker is estimated at 1x10 -5, the cancer risk for the future construction worker is estimated at 1x10 -6, and the hazard index is 0.07. However, as noted in Tables 6-4 and 6-5, the actual risk is likely to be one category lower due to bias in the risk estimate (see Paragraph 6.5.10 for discussion). Therefore, all alternatives are considered protective of human health. Alternative 2 reduces the potential for direct contact with contaminated soils and is therefore protective of the current depot worker. Neither Alternative 1 (No Action) nor Alternative 2 (Institutional Controls) addresses the migration of VOCs to groundwater. Alternatives 3 (SVE) and 4 (Excavation) remove the VOC contamination and eliminate the potential threat to groundwater and are therefore protective of human health and the environment.

8.3.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for PCE and TCE in soil at the Group A sites. Since Alternatives 1 (No Action) and 2 (Institutional Controls) do not involve any treatment or removal actions, they do not comply with these chemical-specific TBCs. Alternatives 3 (SVE) and 4 (Excavation) meet these TBCs through treatment (Alternative 3) or by excavating and disposing of the contaminated soils off site (Alternative 4). The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 and 4 are met, as are the air emission controls (best available technology) that apply to Alternative 3.

8.3.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of VOCs in soil to groundwater because VOC-contaminated soils remain on site. Alternative 3 (SVE) and Alternative 4 (Excavation) provide long-term effectiveness and permanence by reducing VOC concentrations in soil or removing VOC-contaminated soils from the site, respectively.

8.3.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action), 2 (Institutional Controls), and 4 (Excavation) do not actively reduce the toxicity, mobility, or volume of TCE or PCE in soils at the Group A sites through treatment. The toxicity, mobility, and volume of these contaminants in soil is reduced through treatment in Alternative 3(SVE).

8.3.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Remedial workers could be exposed to contaminated soils during drilling (Alternative 3 - SVE) or excavation and disposal (Alternative 4). However, dust control and protective measures could be taken to minimize these risks. The heavy truck traffic associated with transporting excavated soils off site in Alternative 4 (Excavation) may impact the surrounding community. Following construction of the SVE system in Alternative 3, remedial workers could be exposed to extracted vapors during operation and maintenance. Remediation under Alternative 3 is estimated to take approximately six months. Alternative 4 would take approximately three months to implement.

8.3.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are easily implementable. Alternative 3 (SVE) is also readily implementable. Conventional drilling equipment can be used to install SVE wells, as the wells are relatively shallow (i.e., less than 20 feet deep). SVE is a commercially available technology, and SVE systems are generally easy to install and maintain. For Alternative 4 (Excavation), conventional equipment can be used to excavate the soil. However, due to the depths of soil contamination, shoring is required during excavation.

8.3.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000 for each Group A site. Alternative 2 (Institutional Controls) is expected to cost $65,000 per site. These costs assume that five-year site reviews will be discontinued after ten years because soil contamination is expected to be reduced below levels of concern within that time frame. The costs to implement SVE at the Group A sites in Alternative 3 are estimated at $266,000 for SWMU 1/Area 2, $140,000 for Area 1 Building 237, and $242,000 for Area 3. The costs of Alternative 4 (Excavation) include excavation and off-site disposal at a Class I facility. These costs are estimated at $19,785,000 for SWMU 1/Area 2, $5,607,000 for Area 1 Building 237, and $16,662,000 for Area 3.

8.3.9 State and Community Acceptance

The state is not expected to accept Alternative 1 (No Action) or Alternative 2 (Institutional Controls) because they are not protective of the environment. Alternatives 3 (SVE) and 4 (Excavation) are protective of human health and the environment because contaminants are permanently removed from the soils at the Group A sites. Therefore, state and community acceptance is anticipated. One written public comment expressing concern over the potential exposure and high cost of excavation was received (see Responsiveness Summary).

8.4 Analysis of Remedial Alternatives for SWMU 4–- Storm Drain Lagoon

8.4.1 Remedial Alternatives

8.4.1.1 SWMU 4 is a storm drain lagoon. Lagoon sediments have shown elevated concentrations of pesticides and metals that pose a possible threat to ecological receptors. In addition, surface water concentrations of dieldrin and DDT exceed federal ambient water quality criteria (AWQC) for protection of aquatic wildlife. The remedial alternatives developed for SWMU 4 are:

Alternative 1 - No Action
Alternative 2 - Upstream Source Control
Alternative 3 - Excavation and Disposal of Sediments, Evaluate Discharge Concentrations

8.4.1.2 Five-year reviews and long-term sediment, surface water, and groundwater monitoring are included in Alternative 1. Alternative 2 consists of periodically (every five years) removing sediment from storm water conduits upstream of the lagoon, and dewatering and transporting those sediments to an off-site disposal facility. Alternative 3 consists of excavation of the sediment in the storm drain lagoon that is contaminated with metals and pesticides. The excavated sediments would be dewatered and transported to an off-site disposal facility.

8.4.2 Overall Protection of Human Health and the Environment

The cancer risk estimated for the current depot worker is $1x10^{-6}$; however, as noted in Table 6-4, the actual risk is likely to be one category lower due to bias in the risk estimate. The hazard index was estimated at 0.01. Therefore, all alternatives are considered protective of human health. The threat to ecological receptors is not addressed by Alternative 1 (No Action). By removing contaminated sediments upstream, Alternative 2 (Source Control) reduces the potential future threats to ecological receptors. Alternative 3 (Excavation) would remove the soil with contaminants. It is uncertain if the concentrations of dieldrin and DDT in the storm water discharged to the canal exceed the AWQC. Alternative 3 requires monitoring of the storm water discharge to determine if the AWQC are complied with.

8.4.3 Compliance with ARARs

Federal ambient water quality criteria for the protection of aquatic wildlife are considered chemical-specific ARARs for surface water discharged to the local irrigation canal. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 2 and 3 are met. For all alternatives, the California Fish and Game Code is a location-specific ARAR.

8.4.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Source Control) do not prevent the exposure of ecological receptors to constituents in the sediment. Alternative 3 relies on excavation to address the threat to ecological receptors. With proper storm water pollution prevention measures, the long-term effectiveness is considered high. The long-term effectiveness will be assessed in the 5-year review to ensure there is no continuing source. Sediment excavation could have a much larger negative impact on the lagoon ecosystem and aquatic biota than the ecological risks posed by the contaminants detected in the sediment.

8.4.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action) and 2 (Source Control) do not actively reduce the toxicity, mobility, and volume of SVOCs and pesticides in lagoon sediments through treatment. However, Alternative 2 reduces further deposition of contaminated sediments into the lagoon. Alternative 3 (Excavation) removes contaminated sediment from the storm drain lagoon, but does not provide treatment.

8.4.6 Short-Term Effectiveness

The implementation of Alternative 1 (No Action) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 2 (Source Control) and 3 (Excavation), remedial workers could be exposed to contaminated sediments during excavation. However, protective measures could be taken to minimize these risks. Sediment excavation activities in Alternative 3 could potentially impact the sensitive nesting and breeding habitats of various waterfowl by disturbing the shoreline and shallow water.

8.4.7 Implementability

There is no action associated with Alternative 1 (No Action). With Alternative 2 (Source Control), conventional soil excavation equipment can be used to remove contaminated sediment from the open storm drain ditches. Alternative 3 (Limited Excavation) may be difficult to implement given the previous problems with draining the lagoon (due to clogging) and a high water table.

8.4.8 Cost

The present worth of Alternative 1 (No Action) is $25,000. This cost assumes that five-year site reviews will be conducted for a 30-year period. The present worth cost for Alternative 2 (Source Control), which includes sediment excavation, dewatering, and off-site disposal, is $1,158,000. The present worth for Alternative 3 (Excavation), which includes excavation of lagoon sediment with dewatering and off-site disposal, is $552,600.

8.4.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) or 2 (Source Control) because they are not protective of ecological receptors. Alternative 3 (Limited Excavation) is protective of both human health and the environment because most of the contaminants in the sediment will be permanently removed from the lagoon. The remainder of the contaminants will be covered with clean fill to isolate them from ecological receptors. Therefore, state and community acceptance of Alternative 3 is anticipated. One written public comment expressing concern over the potential exposure and high cost of excavation was received (see Responsiveness Summary).

8.5 Analysis of Remedial Alternatives for SWMU 6-- Building 28 Sump

8.5.1 Remedial Alternatives

8.5.1.1 SWMU 6 is the former location of a 250-gallon concrete sump that was removed in 1988. Pesticide and herbicide contamination in soil has been detected immediately adjacent to the sump excavation at depths from below the sump excavation to directly above the water table. The pesticides dicamba, dieldrin, heptachlor, 2,4,5-T, and lindane detected at the site could potentially pose a threat to background groundwater quality. The remedial alternatives developed for SWMU 6 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - In Situ Stabilization
Alternative 4 - Excavation and Disposal

8.5.1.2 Alternative 1 includes five-year site reviews and long-term monitoring. Alternative 2 includes the components of Alternative 1 plus land use restrictions around areas where elevated levels of contaminants have been detected at the site. Alternative 3 consists of using in situ stabilization to physically and chemically immobilize the pesticides detected in the soil. Alternative 4 consists of excavating approximately 60 cubic yards of pesticide-contaminated soil and disposing of it off site at either a Class I or a Class II disposal facility, depending on the level of contamination.

8.5.2 Overall Protection of Human Health and the Environment

The cancer risk to future construction workers at SWMU 6 was estimated at 8.8x10 -8 and the hazard index was 2.7x10 -2. All alternatives are protective of human health. In Alternatives 1 (No Action) and 2 (Institutional Controls), pesticides in the soil could potentially pose a threat to groundwater. With Alternative 3 (Stabilization), pesticides are immobilized in situ, significantly reducing their threat to groundwater. In Alternative 4 (Excavation), the threat to groundwater is eliminated because pesticide-contaminated soils are permanently removed from the site.

8.5.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the pesticides detected in the soil at SWMU 6. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as pesticide-contaminated soil remains at the site. Alternatives 3 (Stabilization) and 4 (Excavation) meet these TBCs by either immobilizing or permanently removing the contaminated soil. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 and 4 are also will met.

8.5.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of constituents in soil to groundwater because the pesticides remain on site. Alternative 3 (Stabilization) significantly reduces the threat to groundwater because the pesticides are immobilized through the stabilization process. Alternative 4 (Excavation) provides long-term effectiveness and permanence through excavation and off-site disposal of pesticide-contaminated soils.

8.5.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action), 2 (Institutional Controls), and 4 (Excavation) do not actively reduce the toxicity, mobility, or volume of contaminants at the site through treatment. Alternative 3 (Stabilization) reduces the mobility of contaminants in the soil through stabilization, but does not reduce their toxicity or volume.

8.5.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (Stabilization) and 4 (Excavation), remedial workers could be exposed to contaminated soil during stabilization and excavation. Also, under Alternative 3 remedial workers could be exposed to the chemicals used for stabilization. Dust control and protective measures could be taken to minimize these risks. Alternative 4 (Excavation) can be completed in approximately three months.

8.5.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. The in situ stabilization in Alternative 3 is a technically feasible, commercially available technology. The materials required for implementing this alternative are readily available. In Alternative 4, conventional earthmoving equipment can be used to excavate the soil. Transporting soils for off-site disposal is also easily implementable.

8.5.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume that five-year site reviews will be discontinued after ten years because contamination is expected to be reduced below levels of concern within that time frame. The present worth cost for the in situ stabilization process in Alternative 3 is $169,000. In Alternative 4, excavation with off-site disposal to a Class II landfill has a present worth cost of $45,000. If disposal at a Class I facility is required, the cost would increase to $65,000.

8.5.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) or 2 (Institutional Controls) because they are not protective of the groundwater beneath the site. Alternatives 3 (Stabilization) and 4 (Excavation) are protective of both human health and the environment because contaminants in soil will be permanently immobilized or removed from the site. Therefore, state and community acceptance of Alternatives 3 and 4 is anticipated. One written public comment was received that expressed concern over the potential exposure and high cost of excavation. It also expressed interest in the encapsulation (stabilization) process (see Responsiveness Summary).

8.6 Analysis of Remedial Alternatives for SWMU 7--Burn Pit No. 1

8.6.1 Remedial Alternatives

8.6.1.1 SWMU 7 (Burn Pit No. 1) comprises seven former burn pits that were used between 1942 and 1954 for disposing of medical supplies containing mercury and phosphate compounds, narcotics, general pharmaceuticals, radiological supplies, and electron tubes. Remedial Investigation (RI) results indicate that pesticides in soils at three of the pits (Pits C, D, and F) may pose a threat to groundwater quality. The remedial alternatives developed for SWMU 7 are:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls
- Alternative 3 - In Situ Stabilization with Institutional Controls
- Alternative 4 - Excavation and Disposal with Institutional Controls

8.6.1.2 Alternative 1 consists of five-year site reviews and long-term groundwater monitoring. Alternative 2 includes these components and adds land use restrictions around the disposal pits where elevated levels of contaminants have been detected. If ownership of the depot is transferred to private or non-federal entities, restrictive covenants could be written into the property deed. Alternative 3 consists of using in situ stabilization to physically and chemically immobilize the contaminants detected in the soil at Pits C, D, and F. Alternative 4 involves excavating approximately 3,600 cubic yards of contaminated soils from these three pits and disposing of them off site at a Class I disposal facility. Both Alternatives 3 (Stabilization) and 4 (Excavation) also include institutional controls because portions of the pits are covered by buildings.

8.6.2 Overall Protection of Human Health and the Environment

The cancer risk to future construction workers at SWMU 7 was estimated at 4.2×10^{-7} and the hazard index was estimated at 9.2. However, the hazard index was elevated because of manganese concentrations that are typical of those throughout the western United States. All alternatives are protective of human health under the scenarios considered. However, Alternatives 1 (No Action) and 2 (Institutional Controls) do not mitigate the threat to groundwater posed by contaminants in the soil. Alternative 3 (Stabilization) immobilizes pesticides in situ, significantly reducing the potential threat to groundwater. Alternative 4 (Excavation) provides the greatest protection to human health and the environment because contaminated soils are permanently removed from the site.

8.6.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in the soil at SWMU 7. The potential threats to background water quality have not yet been confirmed through monitoring. Alternative 1 (No Action) does not comply with the chemical-specific TBCs. If long-term monitoring in Alternative 2 (Institutional Controls) identifies a concern, the implementation of Alternative 2 would be modified to ensure the protection of the groundwater. Therefore, Alternative 2 is considered to comply with these chemical-specific TBCs. Alternatives 3 (Stabilization) and 4 (Excavation) also meet these TBCs by either immobilizing or permanently removing the contaminated soil. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 and 4 are also met.

8.6.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the potential migration of soil constituents to groundwater because the pesticides remain on site. Alternative 2 does include long-term monitoring to evaluate the long term effectiveness. Alternative 3 (Stabilization) significantly reduces the threat to groundwater because the pesticides are immobilized through the stabilization process. Alternative 4 (Excavation) provides long-term effectiveness and permanence through excavation and off-site disposal of pesticide-contaminated soils.

8.6.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action), 2 (Institutional Controls), and 4 (Excavation) do not actively reduce the toxicity, mobility, or volume of contaminants at the site through treatment. Alternative 3 (Stabilization) reduces the mobility of pesticides and other contaminants in the soil through stabilization, but does not reduce their toxicity or volume.

8.6.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (Stabilization) and 4 (Excavation), remedial workers could be exposed to contaminated soil during stabilization and excavation. Under Alternative 3, remedial workers could be exposed to stabilization chemicals. However, dust control and protective measures could be taken to minimize these risks. Alternative 4 can be completed in approximately three months.

8.6.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. The in situ stabilization in Alternative 3 (Stabilization) is a technically feasible, commercially available technology. The materials required for implementing this alternative are readily available. In Alternative 4 (Excavation), conventional earthmoving equipment can be used to excavate the soil. Transporting soils for off-site disposal is also easily implementable.

8.6.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $208,000. These costs assume two five-year site reviews. The present worth cost for the in situ stabilization process and institutional controls in Alternative 3 (Stabilization) is $822,000. The present worth cost for Alternative 4 (Excavation), which combines excavation with off-site disposal and institutional controls, is $2,605,000.

8.6.9 State and Community Acceptance

The state is not expected to accept Alternative 1 (No Action) because it may not be protective of future land use conditions or groundwater beneath the site. The land use restrictions in Alternative 2 (Institutional Controls) and the long-term groundwater monitoring ensure protection of groundwater. (There is a potential threat to groundwater quality that has not been confirmed through historical monitoring.) Therefore Alternative 2 is expected to be acceptable to both the state and the public. Alternatives 3 (Stabilization) and 4 (Excavation) are protective of both human health and the environment because contaminants in the soil are permanently immobilized or removed from the site. Therefore, state and community acceptance is anticipated for Alternatives 3 and 4 as well. One written public comment was received that expressed concern over the potential exposure and high cost of excavation. It also expressed interest in the encapsulation (stabilization) process (see Responsiveness Summary).

8.7 Analysis of Remedial Alternatives for SWMU 8--Burn Pit No. 2

8.7.1 Remedial Alternatives

8.7.1.1 SWMU 8 is a single large burn pit. Polynuclear aromatic hydrocarbons (PAHs), phthalates, pesticides, dioxins/furans, metals, and petroleum hydrocarbons were detected in soils in the pit. The site contaminants potentially pose a threat to groundwater. The remedial alternatives developed for SWMU 8 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Bioventing
Alternative 4 - Excavation and Disposal

8.7.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the disposal pits. If ownership of the depot is transferred to private or non-federal agencies in the future, restrictive covenants could be written into the property deed. Alternative 3 consists of injecting air into the subsurface to enhance natural aerobic degradation processes in the vadose zone. Three air injection well clusters are needed, and a pad-mounted blower would be installed adjacent to the injection wells. Alternative 4 involves excavating contaminated soil (approximately 2,600 cubic yards) and debris (approximately 1,900 cubic yards) and transporting them off site to Class I and Class III disposal facilities, respectively.

8.7.2 Overall Protection of Human Health and the Environment

All alternatives are protective of human health under the current depot worker exposure scenario. Alternative 1 (No Action) is not protective of the future construction worker. The estimated cancer risk associated with organochlorine pesticides is between $1x10^{-4}$ and $1x10^{-6}$, and the hazard index is greater than 1 for this scenario. The land use restrictions in Alternative 2 (Institutional Controls) provide some protection for the future construction worker. However, neither Alternative 1 nor Alternative 2 mitigate the threat to groundwater posed by contaminants in the soil. Alternative 3 (Bioventing) involves the biodegrading petroleum hydrocarbons and some SVOCs in situ; however, pesticides, PCBs, and dioxin/furans are not readily biodegraded and the potential threat to groundwater from pesticides, PCBs, and dioxin/furans would remain. Alternative 4 (Excavation) provides the greatest protection to human health and the environment because contaminated soils are permanently removed from the site.

8.7.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in the soil at SWMU 8. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as the constituents of concern would remain in the soil at the site. Alternative 3 (Bioventing) also may not comply with this TBC for all contaminants of concern because pesticides in the soil would not be treated through bioventing. Alternative 4

(Excavation) meets these TBCs by permanently removing the contaminated soil from the site. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 (Bioventing) and 4 (Excavation) are met.

8.7.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of constituents in the soil to groundwater because contaminants remain on site. Alternative 3 (Bioventing) eliminates the threat to groundwater from petroleum hydrocarbons and SVOCs, but it does not reduce the potential threat to groundwater from pesticides because these constituents are not amenable to biodegradation. Alternative 4 (Excavation) provides long-term effectiveness and permanence through the excavation and off-site disposal of pesticide-contaminated soils.

8.7.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action), 2 (Institutional Controls), and 4 (Excavation) do not actively reduce the toxicity, mobility, or volume of contaminants at the site through treatment. Alternative 3 (Bioventing) reduces the toxicity, mobility, and volume of petroleum hydrocarbons and SVOCs at SWMU 8, but does not reduce the toxicity, mobility, or volume of pesticides, PCBs, or dioxin/furans at the site.

8.7.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (Bioventing) and 4 (Excavation), remedial workers could be exposed to contaminated soil during drilling and excavation. However, various dust control and protective measures could be taken to minimize these risks. Following the installation of the bioventing system, it will take approximately two years to biodegrade petroleum hydrocarbons in the soil. Alternative 4 (Excavation) can be completed in approximately three months or less.

8.7.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. With Alternative 3 (Bioventing), conventional drilling equipment can be used to install bioventing wells because they will are relatively shallow; however, installing the wells may be difficult because of the construction debris buried in the former burn pit. The system might also short-circuit because of the debris. In Alternative 4 (Excavation), conventional earthmoving equipment can be used to excavate the soil. Transporting soils for off-site disposal is also easily implementable.

8.7.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume two five-year site reviews. The present worth cost of the bioventing system in Alternative 3 is $246,000. The cost for Alternative 4, which includes excavation and off-site disposal, is $2,823,000.

8.7.9 State and Community Acceptance

The state is not expected to accept Alternative 1 (No Action) because it is not protective of human health for the future construction worker or protective of groundwater beneath the site. State acceptance is also not expected with Alternatives 2 (Institutional Controls) and 3 (Bioventing) because of the potential future threat to groundwater. Alternative 4 (Excavation) is protective of both human health and the environment because contaminants in the soil are permanently removed from the site. Therefore, state and community acceptance is anticipated for this alternative. One written public comment was received that expressed concern over the potential exposure and high cost of excavation (see Responsiveness Summary).

8.8 Analysis of Remedial Alternatives for SWMU 20-- Aboveground Solvent Tank/Building 26 Recoup Operations and Area 1 Building 10

8.8.1 Remedial Alternatives

8.8.1.1 SWMU 20 consists of two sumps associated with an aboveground solvent tank located at Building 10 and contaminated soils at Area 1 Building 10. Modeling results indicate that TCE, SVOCs, pesticides, and herbicides detected in the soil at these sites pose a potential threat to beneficial uses of groundwater. The remedial alternatives developed for SWMU 20 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - SVE with Excavation and Disposal and Natural Attenuation
Alternative 4 - Excavation and Disposal and Natural Attenuation

8.8.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the areas of contamination. If ownership of the depot is transferred to private or non-federal agencies in the future, restrictive covenants could be written into the property deed. Alternative 3 involves excavating the SWMU 20 sumps and the floor drain at Building 26. The excavated material would be transported and disposed of off site. SVE would be performed in Area 1 Building 10 to reduce the TCE concentrations to below the cleanup level. Soil contaminated with 2,4-dinitrophenol and 2,4,6-trichlorophenol at 15 feet bgs would be allowed to attenuate naturally. Alternative 4 is the same as Alternative 3, except that the TCE-contaminated soils are excavated and transported off site rather than treated by SVE.

8.8.2 Overall Protection of Human Health and the Environment

The risk to depot workers at SWMU 20 was estimated at 2.2x10 -7 and the hazard index at 0.3. All alternatives are protective of human health. However, Alternatives 1 (No Action) and 2 (Institutional Controls) do not mitigate the threat to groundwater posed by VOCs and phthalates in the soils. Alternatives 3 (SVE/Excavation/Natural Attenuation) and 4 (Excavation/Natural Attenuation) permanently remove contaminated soils and sludges associated with the sumps and the floor drain, thereby eliminating the potential threat to groundwater at those locations. TCE at Area 1 Building 10 is removed through SVE in Alternative 3 and excavation and off-site disposal in Alternative 4. The removal TCE eliminates the threat to groundwater at that location.

8.8.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in the soil at SWMU 20 and Area 1 Building 10. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as the constituents of concern remain in the soil at the site. Alternatives 3 (SVE/Excavation/Natural Attenuation) and 4 (Excavation/Natural Attenuation) meet these TBCs by permanently removing the contaminants from the site. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 and 4 are met.

8.8.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of constituents in the soil to groundwater because the contaminants remain on site. Alternatives 3 (SVE/Excavation/Natural Attenuation) and 4 (Excavation/Natural Attenuation) provide long-term effectiveness and permanence because contaminated soils are excavated and disposed of off site or treated via SVE.

8.8.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action), 2 (Institutional Controls) and 4 (Excavation/Natural Attenuation) do not actively reduce the toxicity, mobility, or volume of contaminants at the site through treatment. Alternative 3 (SVE/Excavation/Natural Attenuation) reduces the toxicity, mobility, and volume of TCE at Area 1 Building 10 through SVE.

8.8.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (SVE/Excavation/Natural Attenuation) and 4 (Excavation/Natural Attenuation), remedial workers could be exposed to contaminated soil during drilling and excavation activities. However, dust control and protective measures could be taken to minimize these risks. Alternatives 3 and 4 could each be completed in less than three months.

8.8.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. With Alternative 3 (SVE/Excavation/Natural Attenuation), conventional equipment can be used to install and maintain the SVE system. Conventional earthmoving equipment can be used to excavate and transport soils in Alternatives 3 and 4 (Excavation/Natural Attenuation).

8.8.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume two five-year site reviews. The present worth cost for the SVE system and the excavation and off-site disposal in Alternative 3 (SVE/Excavation/Natural Attenuation) is $293,000. The present worth cost for excavation and off-site disposal in Alternative 4 (Excavation/Natural Attenuation) is $355,000.

8.8.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) or 2 (Institutional Controls) because they are not protective of groundwater beneath the site. Alternatives 3 (SVE/Excavation/Natural Attenuation) and 4 (Excavation/Natural Attenuation) are protective of both human health and the environment because contaminants in the soil are permanently removed from the site either by treatment or by excavation. Therefore, state and community acceptance is anticipated for these alternatives. One written public comment was received that expressed concern over the potential exposure and high cost of excavation (see Responsiveness Summary).

8.9 Analysis of Remedial Alternatives for SWMU 24-Petroleum Waste Oil Tank

8.9.1 Remedial Alternatives

8.9.1.1 SWMU 24 was a 500-gallon underground storage tank (UST) that was used to store petroleum wastes derived from materials testing in Building 247. During UST removal, visibly contaminated soil from the excavation was disposed of off site. The remaining soil contamination is limited to soils within and immediately surrounding the tank excavation. The VOCs, SVOCs, petroleum hydrocarbons, PCBs, and pesticides remaining in the soil at the site may pose a threat to background groundwater quality. The remedial alternatives developed for SWMU 24 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Bioventing
Alternative 4 - Excavation and Disposal
Alternative 5 - Excavation and On-Site Bioremediation

8.9.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the area of contamination. If ownership of the depot is transferred to private or non-federal agencies in the future, restrictive covenants could be written into the property deed. Alternative 3 consists of injecting air into the subsurface to enhance natural aerobic degradation processes in the vadose zone. Due to the limited aerial extent of the VOC contamination, only one air injection well is needed. Alternative 4 involves excavating approximately 240 cubic yards of contaminated soil and transporting it off site to a Class I disposal facility. Alternative 5 involves excavating the contaminated soil and treating it aboveground using on-site bioremediation. This treatment involves spreading and tilling soil on a treatment pad to enhance the natural biodegradation of hydrocarbon compounds.

8.9.2 Overall Protection of Human Health and the Environment

The cancer risk estimated far the future construction worker at this site is 1x10 -6 , and the hazard index was estimated, to be 10. The risk is associated with exposure to PAHs and manganese (see Section 6.5). Remediation of these compounds was not deemed necessary. The risk associated with exposure to VOCs in indoor air was estimated at 0.7. Alternatives 1 (No Action) and 2 (Institutional Controls) do not mitigate the threat to groundwater posed by the contaminants in the soil. Alternatives 3 (Bioventing) and 5 (Excavation/Bioremediation) involve biodegrading VOCs, SVOCs, and petroleum hydrocarbons in situ but pesticides and PCBs do not biodegrade. However, the potential threat to groundwater from these pesticides and PCBs is considered low relative to the threat posed by other contaminants of concern. Alternative 4 (Excavation/Disposal) provides the greatest protection to human health and the environment because contaminated soils are permanently removed from the site.

8.9.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in the soil at SWMU 24. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as the constituents of concern remain in the soil at the site. Alternatives 3 (Bioventing), 4 (Excavation/Disposal), and 5 (Excavation/Bioremediation) meet these TBCs by treating the contaminated soil through bioventing (Alternative 3), bioremediation (Alternative 5), or excavation and off-site disposal (Alternative 4). Although bioventing and bioremediation do not address the PCB or pesticide soil contamination at SWMU 24, the groundwater threat posed by these compounds is considered low. Pesticide detections were infrequent and none of the pesticides or PCBs in soil have been detected in groundwater near the site. PCBs were only detected in one boring (SB-192) and the concentrations of both PCBs and pesticides decreased with increasing depth. Removing these compounds from underneath existing buildings was not considered justified at this time. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 through 5 are also met.

8.9.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of soil constituents to groundwater because contaminants remain on site. Alternatives 3 (Bioventing) and 5 (Excavation/Bioremediation) eliminate the threat to groundwater from VOCs, SVOCs, and petroleum hydrocarbons; however, they do not reduce the potential threat to groundwater from pesticides and PCBs because these constituents are not amenable to biodegradation. Alternative 4 (Excavation/Disposal) provides long-term effectiveness and permanence through excavation and off-site disposal of contaminated soils.

8.9.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 (No Action), 2 (Institutional Controls), and 4 (Excavation/Disposal) do not actively reduce the toxicity, mobility, or volume of contaminants at the site through treatment. Alternatives 3 (Bioventing) and 5 (Excavation/Bioremediation) reduce the toxicity, mobility, and volume of VOCs, SVOCs, and petroleum hydrocarbons at SWMU 24, but do not treat the PCBs and pesticides at the site.

8.9.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (Bioventing), 4 (Excavation/Disposal), and 5 (Excavation/Bioremediation), remedial workers could be exposed to contaminated soil during drilling, excavation, and operation of the aboveground bioremediation cell. However, dust control and protective measures could be taken to minimize these risks. Following the construction of the bioventing system in Alternative 3, it will take approximately two years to biodegrade the constituents of concern in the soil. Alternative 4 (Excavation) can be completed in approximately three months.

8.9.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. With Alternative 3

(Bioventing), conventional drilling equipment can be used to install the bioventing well, as it is relatively shallow. Alternatives 4 (Excavation/Disposal) and 5 (Excavation/Bioremediation) may be difficult to implement because they require the excavation of soil beneath Building 247. In addition, some shoring is required because soils need to be excavated to a depth of 17 feet bgs. The transportation and off-site disposal of soil in Alternative 4 (Excavation/Disposal) are readily implementable. The chemicals and equipment needed for biotreatment in Alternative 5 are also readily available. The treatment pad could be easily constructed on land available in the southern portion of the base.

8.9.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume two five-year site reviews. The present worth cost for the bioventing system in Alternative 3 (Bioremediation) is $166,000. The present worth cost for Alternative 4 (Excavation/Disposal), which includes excavation and off-site disposal, is $214,000. The present worth cost of Alternative 5 (Excavation/Bioremediation), excavation with on-site bioremediation, is estimated at $263,000.

8.9.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) or 2 (Institutional Controls) because they do not mitigate the threat to the groundwater beneath the site. Alternatives 3 (Bioremediation), 4 (Excavation/Disposal), and 5 (Excavation/Bioremediation) reduce the threat to groundwater from VOCs, SVOCs, and petroleum hydrocarbons and are protective of human health. Therefore, state and community acceptance is anticipated for these alternatives. One written public comment was received that expressed concern over the potential exposure and high cost of excavation (see Responsiveness Summary).

8.10 Remedial Alternatives for SWMU 27-Building 206 Roundhouse Sump/Area 1 Building 206

8.10.1 Remedial Alternatives

8.10.1.1 SWMU 27 consists of the waste oil sump, the service pit, the locomotive pit, and the area around the floor drain in the demolished Building 206. Elevated levels of PAHs and PCBs were detected at shallow depths at this site. Exposure to these constituents in soil could cause a cancer risk greater than 10^{-6} to potential future depot workers. Also, VOCs, herbicides, and petroleum hydrocarbons in the soil pose a potential threat to groundwater quality. The remedial alternatives developed for SWMU 27 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Excavation and Disposal

8.10.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the area of contamination. If ownership of the depot is transferred to private or non-federal agencies in the future, restrictive covenants could be written into the property deed. Alternative 3 involves excavating the waste oil sump that has been filled with sand, the contaminated soil beneath the railroad tracks, and the contaminated soil at SB469. The excavated material, approximately 130 cubic yards, is transported off site to a Class I disposal facility.

8.10.2 Overall Protection of Human Health and the Environment

The cancer risk estimated for the future construction worker at this site is 5×10^{-6}. Alternative 1 (No Action) is not protective of human health for the current depot worker. The estimated cancer risk is 3×10^{-4} for this scenario. By reducing the potential for direct contact of contaminated soils through land use restrictions, Alternative 2 (Institutional Controls) is protective of the current depot worker. Because contaminants remain on site, neither Alternative 1 nor Alternative 2 mitigates the threat to groundwater posed by contaminants in the soil. Alternative 3 (Excavation) permanently removes contaminated soil from the site, thereby eliminating the potential threat to future depot workers and the potential threat to groundwater quality at this location.

8.10.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific ARARs that are protective of groundwater were developed for the constituents of concern in the soil at SWMU 27. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as the constituents of concern remain in the soil at the site. Alternative 3 (Excavation) meets these TBCs by permanently removing the contaminated soils from the site. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternative 3(Excavation) are also met.

8.10.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of constituents in the soil to groundwater because contaminants remain on site. In addition, Alternative 1 does not prevent adverse human exposure under a future construction worker exposure scenario. Alternative 3 (Excavation) provides long-term effectiveness and permanence because contaminated soils are permanently removed from the site.

8.10.5 Reduction of Toxicity, Mobility, and Volume through Treatment

None of the alternatives actively reduces the toxicity, mobility, or volume of contaminants at the site through treatment.

8.10.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternative 3 (Excavation), remedial workers could be exposed to contaminated soil during excavation activities. However, dust control and protective measures could be taken to minimize these risks. Alternative 3 could probably be implemented in less than three months.

8.10.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. With Alternative 3, conventional earthmoving equipment can be used to excavate and transport soils to an off-site disposal facility.

8.10.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume two five-year site reviews. The present worth cost for the excavation and off-site disposal described in Alternative 3 (Excavation)is $112,000.

8.10.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) and 2 (Institutional Controls) because they do not mitigate the potential threat to groundwater beneath the site, and Alternative 1 is not protective of human health for the current depot worker. Alternative 3 (Excavation) eliminates the threat to groundwater and is protective of human health. Therefore, state and community acceptance is anticipated for Alternative 3. One written public comment was received that expressed concern over the potential exposure and high cost of excavation (see Responsiveness Summary).

8.11 Analysis of Remedial Alternatives for Building 30 Drum Storage Area

8.11.1 Remedial Alternatives

8.11.1.1 The Building 30 Drum Storage Area is located near the Consolidated Subsistence facility. Buried drums (removed in 1991) were discovered during construction of the Consolidated Subsistence facility. Phthalate compounds and benzyl alcohol were detected in the soil at concentrations that could pose a threat to background groundwater quality. The remedial alternatives developed for the Building 30 Drum Storage Area are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Excavation and Disposal

8.11.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the area of contamination. If ownership of the depot is transferred to private or non-federal agencies in the future, restrictive covenants could be written into the property deed. Alternative 3 involves excavating approximately 2,800 cubic yards of contaminated soil at the site. Depending on the level of contamination, soils will be disposed of off site at either a Class I or a Class II disposal facility.

8.11.2 Overall Protection of Human Health and the Environment

The cancer risk to future construction workers at the Building 30 Drum Storage Area was estimated at 9x10 -7 and the hazard index as 0.3. All alternatives are protective of human health. However, since contaminants remain on site, neither Alternative 1 (No Action) nor Alternative 2 (Institutional Controls) mitigates the threat to groundwater posed by contaminants in the soil. Alternative 3 (Excavation) permanently removes contaminated soil from the site, thereby eliminating the potential threat to groundwater quality at this location.

8.11.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in the soil at the Building 30 Drum Storage Area. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as the constituents of concern remain in the soil at the site, Alternative 3 (Excavation) meets these TBCs by permanently removing the contaminated soils from the site. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternative 3 (Excavation) are also met.

8.11.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the potential migration of soil constituents to groundwater because contaminants remain on site. Alternative 2 does include groundwater monitoring to evaluate the long-term effectiveness. By removing contaminated soils from the site, Alternative 3 (Excavation) eliminates any threat to groundwater and provides long-term effectiveness and permanence.

8.11.5 Reduction of Toxicity, Mobility, and Volume through Treatment

None of the alternatives actively reduces the toxicity, mobility, or volume of contaminants at the site through treatment.

8.11.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternative 3 (Excavation), remedial workers could be exposed to contaminated soil during excavation activities. However, dust control and protective measures could be implemented to minimize these risks. Alternative 3 could probably be implemented in less than three months.

8.11.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. With Alternative 3, conventional earthmoving equipment can be used to excavate and transport soils to an off-site disposal facility. However, excavation may be difficult to implement because soil excavation could disrupt robotics operations in Building 30.

8.11.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $87,000. These costs assume two five-year site reviews and installation of a downgradient monitoring well in Alternative 2. The present worth cost for excavation and off-site disposal to a Class II disposal facility in Alternative 3 is $907,000. If disposal at a Class I facility is required, the cost increases to $1,860,000.

8.11.9 State and Community Acceptance

The state is not expected to accept Alternative 1 (No Action) because it does not mitigate the potential threat to groundwater beneath the site. State acceptance of Alternative 2 (Institutional Controls) is anticipated because of the proposed monitoring program to identify and respond to any groundwater impacts. Alternative 3 (Excavation) eliminates the threat to groundwater and is protective of human health; therefore, state and community acceptance is anticipated. One written public comment was received that expressed concern over the potential exposure and high cost of excavation (see Responsiveness Summary).

8.12 Analysis of Remedial Alternatives for Surface and Near-Surface Soil-Northern Depot Area

8.12.1 Remedial Alternatives

8.12.1.1 Pesticides and metals are present in shallow soils at locations not associated with any particular point source at the depot. Based on sampling results, a hazard index of 30 from arsenic and manganese was calculated in the northern area of the depot. This result concerns a potential exposure scenario for a depot worker being trained as a grader operator. The remedial alternatives developed for surface soils and near-surface soils in the Northern Depot Area are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Asphalt Cover
Alternative 4 - Excavation and Disposal

8.12.1.2 Alternative 1 includes five-year site reviews and long-term groundwater monitoring. Alternative 2 includes restricting access (posting signs) to the areas where elevated concentrations of arsenic and manganese have been detected and two five-year site reviews. Alternative 3 consists of installing an asphalt cover over the soils with elevated levels of arsenic and manganese. The area requiring an asphalt covering is estimated at 140,000 square feet. Alternative 4 involves excavating approximately 3,000 cubic yards of soils with elevated arsenic and manganese concentrations and transporting them off site to a Class II or Class III disposal facility, depending on the level of contamination.

8.12.2 Overall Protection of Human Health and the Environment

The northern depot area soils pose a cancer risk Of 9 x 10 -7 to future grader operators and the estimated hazard index is 30. Soil contaminants in the surface and near-surface soils are not considered to pose a potential threat to groundwater in any of the alternatives. Alternative 1(No Action) may not be protective of human health for the future grader operators, as the hazard index for this scenario exceeds 30. Alternative 2 (Institutional Controls) provides some protection to human health by reducing the potential for grader operators to be exposed to contaminated soils. Alternative 3 (Asphalt Cover) significantly reduces exposure by covering the soils with asphalt. Alternative 4 (Excavation) provides the greatest protection to human health and the environment because contaminated soils are permanently removed from the site.

8.12.3 Compliance with ARARs

No chemical-specific ARARs are identified for the constituents of concern in the surface and near-surface soils in the Northern Depot Area. The chemicals of concern in surface and near surface soils in the Northern Depot Area are not considered to pose a threat to groundwater, therefore, chemical-specific TBCs do not need to be developed in accordance with Water Quality Goals. Also, location-specific ARARs are identified for this site. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 3 (Asphalt Cover) and 4 (Excavation) are met.

8.12.4 Long-Term Effectiveness

Alternative 1 (No Action) does not control exposure to contaminated soil, nor does it provide a long-term management measure. Alternative 2 (Institutional Controls) provides control measures to reduce the potential for contact by depot workers at the site. Alternative 3 (Asphalt Cover) provides a reliable barrier to human contact and thus prevents depot workers from being exposed to arsenic and manganese in the soil. However, since contaminants remain on site, some long-term potential for exposure continues to exist. Alternative 4 (Excavation) provides long-term effectiveness and permanence through excavation and off-site disposal of contaminated soils.

8.12.5 Reduction of Toxicity, Mobility, and Volume through Treatment

None of the alternatives actively reduces the toxicity, mobility, or volume of contaminants at the site through treatment.

8.12.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternatives 3 (Asphalt Cover) and 4 (Excavation), remedial workers could be exposed to contaminated soil during capping and soil excavation. However, dust control and protective measures could be taken to minimize these risks. Alternative 4 (Excavation) can be completed in approximately three months.

8.12.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. The asphalt cover in Alternative 3 is relatively easy to install. Standard techniques, equipment, and materials for the asphalt cover could be employed. In Alternative 4 (Excavation), conventional earthmoving equipment can be used to excavate the soil. The transportation of soils and off-site disposal are also easily implementable.

8.12.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $17,000. These costs assume two five-year site reviews. The present worth cost for the asphalt cover in Alternative 3 is $504,000. The present worth cost for Alternative 4, which includes excavation with off-site disposal, is $769,000 for disposal at a Class III facility. The cost would increase to $995,000 if disposal at a Class II facility is required.

8.12.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) and 2 (Institutional Controls) because they do not mitigate the potential threat to the future construction worker. Alternatives 3 (Asphalt Cover) and 4 (Excavation) eliminate the threat to human health and are protective of the environment; therefore, state and community acceptance is anticipated. One written public comment was received that expressed concern over the potential exposure and high cost of excavation. It also expressed interest in the asphalt-capping alternative (see Responsiveness Summary).

8.13 Remedial Alternatives for SWMUs 2 and 3-the Sewage and Industrial Waste Lagoons

8.13.1 Remedial Alternatives

8.13.1.1 SWMUs 2 and 3 are located in the northern part of the depot, adjacent to the Sewage Treatment Plant. According to the Engineering Evaluation/Cost Analysis (EE/CA that was prepared for SWMUs 2, 3, and 33, the recommended alternative for the lagoons is excavation with off-site disposal. The remedial alternatives developed for SWMUs 2 and 3 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Excavation and Disposal

8.13.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the lagoons. Alternative 3 (selected in the EE/CA) involves excavating approximately 10,000 cubic yards of soil with contaminant concentrations above soil cleanup standards. It is assumed that these soils can be disposed of at a nearby Class III (municipal) facility.

8.13.2 Overall Protection of Human Health and the Environment

The maximum cancer risk estimated for the current depot worker at these sites is $3x10^{-6}$. The risk hazard index was estimated at 0.07. Neither Alternative 1 (No Action) nor Alternative 2 (Institutional Controls) mitigates the threat to groundwater posed by contaminants in the soil. Alternative 3 (Excavation) permanently removes contaminated soil from the site, thereby eliminating the potential threat to groundwater quality at this location. Threats to ecological receptors will be addressed by installation of a geofabric filter and bringing in clean fill to isolate receptors from contaminants.

8.13.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in soil at SWMUs 2 and 3. Alternatives 1 (No Action) and 2 (Institutional Controls) are not expected to comply with these chemical-specific ARARs, as the constituents of concern remain at the site. Alternative 3 (Excavation) meets these ARARs by permanently removing the contamination through excavation and off-site disposal. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternative 3 (Excavation) are also met.

8.13.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of constituents in the soil to groundwater because contaminants remain on site. By removing contaminated soils from the site, Alternative 3 (Excavation) eliminates any threat to groundwater and provides long-term effectiveness and permanence.

8.13.5 Reduction of Toxicity, Mobility, and Volume through Treatment

None of the alternatives actively reduces the toxicity, mobility, or volume of contaminants at the site through treatment.

8.13.6 Short-Term Effectiveness

The implementation of Alternatives 1 (No Action) and 2 (Institutional Controls) does not pose any new risks to the community or any new environmental impacts. Under Alternative 3 (Excavation), remedial workers could be exposed to contaminated soil during excavation. However, dust control and protective measures could be taken to minimize these risks. Alternative 3 (Excavation)could probably be implemented in less than three months.

8.13.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. With Alternative 3 (Excavation), conventional earthmoving equipment can be used to excavate and transport soils to an off-site disposal facility. However, it may not be possible for the municipal landfills in the vicinity of DDJC-Tracy to accept the large quantity of soil that would need to be excavated.

8.13.8 Cost

The estimated ten-year present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume that five-year site reviews are completed for 30 years. The present worth cost for excavation and off-site disposal to a Class III disposal facility (Alternative 3) is $2.1 million.

8.13.9 State and Community Acceptance

The state is not expected to accept Alternatives 1 (No Action) and 2 (Institutional Controls) because they do not mitigate the potential threat to groundwater posed by contaminants in the soil. Alternative 3 (Excavation) eliminates the threat to groundwater and is protective of human health; therefore, state and community acceptance is anticipated. One written public comment was received that expressed concern over the potential exposure, and high cost of excavation (see Responsiveness Summary).

8.14 Analysis of Remedial Alternatives for SWMU 33- Industrial Waste Pipeline

8.14.1 Remedial Alternatives

8.14.1.1 SWMU 33 is an industrial waste pipeline (IWPL) buried 2 feet bgs. The IWPL is no longer used. According to the EE/CA for SWMUs 2, 3, and 33 (Radian, 1996) the removal action for the IWPL involves pressure-grouting the laterals and sumps and excavating the most contaminated soils. Following this removal action, all soil cleanup levels will be attained except those for aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate. SWMU 33 is considered a source area for VOCs and pesticides. The remedial alternatives developed for SWMU 33 are:

Alternative 1 - No Action
Alternative 2 - Institutional Controls
Alternative 3 - Grouting, Limited Excavation, and Disposal (removal action)
Alternative 4 - Excavation and Disposal

8.14.1.2 Alternative 1 includes five-year reviews and long-term groundwater monitoring. Alternative 2 includes five-year reviews, long-term monitoring, and land use restrictions around the areas of contamination. Alternative 3 involves grouting inlets to the entire IWPL, limited excavation, and institutional controls including monitoring potential impacts to water quality. It is assumed that the excavated soils need to be disposed of at a Class I disposal facility. The entire IWPL and all associated soil contamination would be excavated under Alternative 4.

8.14.2 Overall Protection of Human Health and the Environment

Current cancer risks associated with SWMU 33 are estimated at 1x10 -8 and the hazard index at 0.0007. All alternatives are protective of human health. Alternatives 1 (No Action) and 2 do not address any of the contamination that could potentially impact groundwater. Alternative 3 (Grouting, Limited Excavation, Institutional Controls) includes excavation of portions of the IWPL, but a potential, though unconfirmed, threat to groundwater quality would remain at this location. Monitoring would be used to identify any impacts to groundwater quality. Alternative 4 would remove confirmed and unconfirmed threats to the environment.

8.14.3 Compliance with ARARs

In compliance with Water Quality Goals (CVRWQCB, 1993), chemical-specific TBCs that are protective of groundwater were developed for the constituents of concern in soil at SWMU 33. Alternatives 1 (No Action) and 2 (Institutional Controls) do not comply with these chemical-specific TBCs, as the constituents of concern remain at the site. Contaminants also remain in place in concentrations above cleanup standards for Alternative 3 (Grouting, Limited Excavation/Institutional Controls). Alternative 3 removes a portion of the contamination and reduces the potential for the migration of these contaminants. The action-specific ARARs for hazardous waste management (22 CCR, Division 4, Chapter 30, Section 66001 et seq., and 40 CFR 262, 263, and 264) that apply to Alternatives 2 and 3 are also met. Alternative 4 satisfies all ARARs.

8.14.4 Long-Term Effectiveness

Alternatives 1 (No Action) and 2 (Institutional Controls) do not prevent the migration of soil contaminants to groundwater because contaminants remain on site. Alternative 3 (Grouting, Limited Excavation/Institutional Controls) removes a portion of the contaminants, reduces the mobility of the contaminants, and relies on groundwater monitoring to indicate potential threats to groundwater from the contaminants left in place. Alternative 4 has the highest long-term effectiveness because all contaminants would be removed.

8.14.5 Reduction of Toxicity, Mobility, and Volume through Treatment

None of the alternatives actively reduces the toxicity, mobility, or volume of contaminants at the site through treatment.

8.14.6 Short-Term Effectiveness

The implementation of Alternatives 1 and 2 (No Action) do not pose any new risks to the community or any new environmental impacts. Under Alternatives 2, 3 (Grouting, Limited Excavation, Institutional Controls), and 4 (Excavation and Disposal), remedial workers could be exposed to contaminated soil during excavation. However, dust control and protective measures could be taken to minimize these risks.

8.14.7 Implementability

There is no action associated with Alternative 1 (No Action). The land use restrictions in Alternative 2 (Institutional Controls) are readily implementable. Alternative 3 (Grouting, Limited Excavation, Institutional Controls) would use conventional earthmoving equipment to excavate and transport soils to an off-site disposal facility. Alternative 4 (Excavation and Disposal) would be difficult to implement because of the number of subsurface utilities and would impact the mission of DDJC-Tracy by interrupting traffic.

8.14.8 Cost

The estimated present worth for Alternative 1 (No Action) is $15,000. Alternative 2 (Institutional Controls) is expected to have a present worth cost of $65,000. These costs assume that five-year site reviews will be completed for 30 years. In Alternative 3 (Grouting, Limited Excavation, Institutional Controls) the present worth cost for excavation and off-site disposal to a Class I disposal facility is $242,600. Alternative 4 (Excavation and Disposal) has a present worth cost of $4,708,000.

8.14.9 State and Community Acceptance

The state is not expected to accept Alternative 1 (No Action) because it does not mitigate the threats to groundwater at the site. Alternative 2 (Institutional Controls) is not expected to be acceptable because it doesn't address potential threats to groundwater quality. Alternative 3 (Grouting, Limited Excavation, and Institutional Controls) is expected to be acceptable if the groundwater monitoring program has adequate provisions to address potential threats to background groundwater quality from contaminants left in place. Alternative 4 (Excavation and Disposal) is expected to be acceptable to the state. One written public comment was received that expressed concern over the potential exposure and high cost of excavation (see Responsiveness Summary).

Table 8-1. National Contingency Plan (NCP) Evaluation Criteria

Category	Evaluation Criterion	Criterion Definition
Threshold Criteria	Overall Protection of Human Health and the Environment	Addresses whether a cleanup alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled.
	Compliance with ARARs	Addresses whether a remedy will meet all federal and state environmental laws and/or provide grounds for a waiver.
Balancing Criteria	Long-Term Effectiveness and Permanence	Refers to the ability of a remedy to provide reliable protection of human health and the environment over time.
	Reduction of Toxicity, Mobility, or Volume through Treatment	Refers to the preference for a remedy that reduces health hazards, the movement of contaminants, or the quantity of contaminants at the site through treatment of the contaminated media.
	Short-Term Effectiveness	Addresses the period of time needed to complete the remedy, and any adverse effects to human health and the environment that may be caused during the construction and implementation of the remedy.
	Implementability	Refers to the technical and administrative feasibility of a remedy. This includes the availability of materials and services needed to carry out a remedy. It also includes federal, state, and local governments working together to clean up the site.
	Cost	Evaluates capital, operation, and maintenance costs of each alternative in comparison to other equally protective alternatives.
Modifying Criteria	State Acceptance	Indicates whether the state agrees with, opposes, or has no comment on the preferred alternatives.
	Community Acceptance	Includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment may not be completed until public comments on the Proposed Plan are received.

Table 8-2. Comparative Analysis of Alternatives by Site

Site: Dieldrin In Operable Unit 1 Groundwater

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Groundwater Extraction and Treatment Option 1	Alternative 4 Groundwater Extraction and Treatment Option 2
Overall Protection of Human Health and the Environment	Low	Medium	High	Medium
Compliance with ARARs	Low	Low	High	Medium
Long-Term Effectiveness	Low	Medium	High	Medium
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	High	Medium
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	High	High
Cost	$49,000	$99,000	$2,528,000	$1,396,000
State Acceptance	Low	Low	High	Medium
Community Acceptance	Low	Medium	Medium	Medium

Site: Group A Sites

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Soil Vapor Extraction	Alternative 4 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Low	Medium	High	High
Compliance with ARARs	Low	Low	High	High
Long-Term Effectiveness	Low	Medium	High	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	High	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	High	Medium
Cost	$45,000	$195,000	$649,000	$42,054,000
State Acceptance	Low	Low	High	Medium
Community Acceptance	Low	Medium	Medium	Medium

Table 8-2. (Continued)

Site: SWMU 4 - Storm Drain Lagoon

Criteria	Alternative 1 No Action	Alternative 2 Upstream Source Control	Alternative 3 Excavation and Sediment Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	Medium
Compliance with ARARs	Low	Low	Medium
Long-Term Effectiveness	Low	Medium	Medium
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low
Short-Term Effectiveness	Low	Medium	High
Implementability	High	Medium	High
Cost	$25,000	$1,158,000	$552,000
Stale Acceptance	Low	Low	Medium
Community Acceptance	Low	Medium	High

Site: SWMU 6 - Building 28 Sump

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 In Situ Stabilization	Alternative 4 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	High	High
Compliance with ARARs	Low	Low	High	High
Long-Term Effectiveness	Low	Medium	High	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	High	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	High	High
Cost	$15,000	$65,000	$169,000	$45,000 -$65,000
State Acceptance	Low	Low	High	High
Community Acceptance	Low	Medium	Medium	Medium

Table 8-2. (Continued)

Site: SWMU 7 - Burn Pit No. 1

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 In Situ Stabilization	Alternative 4 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	High	High
Compliance with ARARs	Low	High	High	High
Long-Term Effectiveness	Low	Medium	High	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	High	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	High	High
Cost	$15,000	$208,000	$822,000	$2,605,000
State Acceptance	Low	High	High	High
Community Acceptance	Low	Medium	Medium	Medium

Site: SWMU 8 - Burn Pit No. 2

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Bioventing	Alternative 4 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Low	Medium	Medium	High
Compliance with ARARs	Low	Low	Medium	High
Long-Term Effectiveness	Low	Medium	Medium	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Medium	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	Medium	High
Cost	$15,000	$65,000	$246,000	$2,823,000
State Acceptance	Low	Low	Low	High
Community Acceptance	Low	Medium	Medium	Medium

Table 8-2. (Continued)
Site: SWMU 20 - Area 1, Building 10/Building 26

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 SVE with Excavation and Disposal	Alternative 4 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	High	High
Compliance with ARARs	Low	Low	High	High
Long-Term Effectiveness	Low	Medium	High	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	High	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	High	High
Cost	$15,000	$65,000	$293,000	$355,000
State Acceptance	Low	Low	High	High
Community Acceptance	Low	Medium	Medium	Medium

Site: SWMU 24 - Petroleum Waste Oil Tank

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Excavation and Off-site Bioventing	Alternative 4 Excavation and Disposal	Alternative 5 Bioremediation
Overall Protection of Human Health and the Environment	Medium	Medium	Medium	High	Medium
Compliance with ARARs	Low	Low	High	High	High
Long-Term Effectiveness	Low	Medium	Medium	High	Medium
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Medium	Low	Medium
Short-Term Effectiveness	High	High	Medium	Medium	Medium
Implementability	High	High	High	Medium	Medium
Cost	$15,000	$65,000	$166,000	$214,000	$263,000
State Acceptance	Low	Low	High	High	High
Community Acceptance	Low	Medium	Medium	Medium	Medium

Table 8-2. (Continued)
Site: SWMU 27 - Building 206

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Excavation and Off-site Disposal
Overall protection of Human Health and the Environment	Low	Medium	High
Compliance with ARARs	Low	Low	High
Long-Term Effectiveness	Low	Medium	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low
Short-Term Effectiveness	High	High	Medium
Implementability	High	High	High
Cost	$15,000	$65,000	$112,000
State Acceptance	Low	Low	High
Community Acceptance	Low	Medium	Medium

Site: Drum Storage Area - Building 30

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	High
Compliance with ARARs	Low	Low	High
Long-Term Effectiveness	Medium	Medium	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low
Short-Term Effectiveness	High	High	Medium
Implementability	High	High	Medium
Cost	$15,000	$87,000	$907,000
State Acceptance	Low	High	High
Community Acceptance	Low	Medium	Medium

Table 8-2. (Continued)
Site: Surface and Near Surface Soil

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Asphalt Cover	Alternative 4 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Low	Medium	High	High
Compliance with ARARs	High	High	High	High
Long-Term Effectiveness	Low	Medium	Medium	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	High	High
Cost	$15,000	$17,000	$504,000	$769,000-$995,000
State Acceptance	Low	Low	High	High
Community Acceptance	Low	Medium	Medium	Medium

Site: SWMUs 2 and 3 - Sewage and Industrial Waste Lagoons

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Excavation and Off-site Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	High
Compliance with ARARs	Low	Low	High
Long-Term Effectiveness	Medium	Medium	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low
Short-Term Effectiveness	High	High	Medium
Implementability	High	High	Medium
Cost	$15,000	$65,000	$2,100,000
State Acceptance	Low	Low	High
Community Acceptance	Low	Medium	Medium

Table 8-2. (Continued)
Site: SWMU 33 - Industrial Waste Pipeline

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Limited Excavation	Alternative 4 Excavation and Off-Site Disposal
Overall Protection of Human Health and the Environment	Medium	Medium	High	High
Compliance with ARARs	Low	Low	High	High
Long-Term Effectiveness	Medium	Medium	High	High
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low	Low
Short-Term Effectiveness	High	High	Medium	Medium
Implementability	High	High	Medium	Low
Cost	$15,000	$65,000	$242,600	$4,708,000
State Acceptance	Low	Low	High	High
Community Acceptance	Low	Medium	Medium	Medium

9.0 SELECTED REMEDIES

Defense Depot San Joaquin (DDJC)-Tracy, the United States Environmental Protection Agency (U.S. EPA), the Department of Toxic Substances Control (DTSC), and the Central Valley Regional Water Quality Control Board (RWQCB) have selected remedies for each site at DDJC-Tracy. These remedies were selected based on the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), information in the Comprehensive Remedial Investigation/Feasibility Study (RI/FS) (Montgomery Watson, 1996a), a detailed analysis of alternatives, and public comments. Twenty-two sites are recommended for no further action (addressed in Section 9.2). Remedial actions will be taken at the other sites. Designs will be implemented after DDJC-Tracy, U.S. EPA, DTSC, and the RWQCB sign this Record of Decision (ROD). The selected remedies for all sites are summarized in Table 9-1.

9.1 Monitoring Program

9.1.1 There are 104 monitoring wells, 11 extraction wells, and 6 potable water supply wells that are presently being sampled for analysis on a quarterly to annual basis at DDJC-Tracy. Twenty-four extraction wells have been designed and employed for the Operable Unit (OU) 1 groundwater remediation effort and seven new wells are identified in this ROD as part of the selected remedy. The success of the selected remedies identified in this ROD will be, in part, evaluated through the Well Monitoring Program.

9.1.2 The monitoring wells that will initially be used to monitor the performance of the selected remedies are summarized in Table 9-2. The Well Monitoring Program will undergo annual review to ensure that the well locations, monitoring frequency, water level measurements, and analytes are optimized for the long term (see Appendix E for monitoring well locations and the decision logic that will be used to modify the program in response to the monitoring results). Each of the sites (not necessarily every well at each site) recommended for further action in this ROD (see Table 9-1) will be monitored for the analytes identified in this section of the ROD (see specific subsections for each individual site) for no less than three years after soil and groundwater cleanup standards have been attained (per 27 CCR, Section 20410). Furthermore, if wastes remain in place (e.g., under institutional controls), the site will be monitored until cleanup standards are met or until it can be demonstrated that no further threat to water quality remains (27 CCR, Section 20400).

9.1.3 Wastes will remain in place at SWMU 1/Area 2, SWMU 7, SWMU 24, SWMU 33, and Drum Storage Area/Building 30 that could impact groundwater quality at some future date. Monitoring will continue at these sites until an acceptable rationale (e.g., based on additional DI-WET analysis, data from the well monitoring program, or revised vadose zone modeling) demonstrates to the satisfaction of the signatory parties that there is no further threat to groundwater quality.

9.1.4 The Well Monitoring Program will be modified to incorporate all of the site-specific monitoring requirements identified in this section. The following discussions of the selected remedies identify specific monitoring requirements that are part of the selected remedies. The monitoring requirements specified in this ROD are summarized in Table 9-2. The Annual Well Monitoring Report is a primary document. This report will identify and include a qualitative evaluation of all groundwater results and trends that exceed background concentrations (see Table 7-1). This evaluation may include recommendations for additional sampling, additional monitoring wells, or reevaluation of the selected remedy. Each selected remedy of this ROD identifies water quality objectives to protect the beneficial uses of groundwater. If any of these water quality objectives are exceeded, the appropriateness of the selected remedy will be evaluated in the Annual Well Monitoring Report. Groundwater concentrations requiring evaluation are not intended to serve as aquifer cleanup standards. Per the Federal Facilities Agreement (FFA), any party to the agreement may submit a written proposal for additional work or modification of the selected remedy on the basis of the Annual Well Monitoring Report results. DDJC-Tracy and the agencies will jointly determine if any additional remedial action is warranted.

9.2 No Further Action Sites

9.2.1 Twenty-two sites are recommended for no further action (Table 9-1). The Comprehensive RI/FS (Montgomery Watson, 1996a) documented all sites recommended for no further action along with the rationale supporting that decision (see Table 7-15). All sites were carried through to the feasibility study process if the baseline risk assessment results indicated that chemicals of concern (COCs) posed a significant potential risk to humans, plants, or animals. A site was also carried through if it was determined that COCs posed a threat to background groundwater quality or beneficial uses. If neither of these conditions was met, the site was determined to pose no threat to human health and the environment and recommended for no further action. No further action sites were not typically considered in the development of the Well Monitoring Program.

9.2.2 Three sites with COCs were also recommended for no further action. Low levels of COCs were identified at Solid Waste Management Unit (SWMU) 10A, SWMU 14, and SWMU 23 at DDJC-Tracy. Groundwater has not been impacted to date by activities at SWMU 10A. The fate and transport evaluation conducted for SWMU 10A showed that the diethylphthalate and di-n-butylphthalate present in site soils pose a potential threat to background groundwater quality. Both compounds were detected in deep soils, but were suspected laboratory contaminants (Montgomery Watson, 1996a). The cost to excavate possible phthalate contamination was estimated at $2 million to $4.3 million (depending on type of disposal required). Although technically feasible, remediation was not recommended because of the cost, the limited number of detections, and questions regarding the reliability of the data. This site will be assessed through the Well Monitoring Program to determine if groundwater has been impacted by COCs at this site.

9.2.3 The fate and transport evaluations for SWMU 14 and SWMU 23 showed that constituents in soils do not pose a threat to water quality. The baseline risk assessment (Montgomery Watson, 1996e) showed that COCs at SWMU 10A, SWMU 14, and SWMU 23 do not pose unacceptable risk to human health or ecological receptors.

9.3 Day Care Center

The time-critical removal action at the Day Care Center eliminated the incremental cancer risk above background concentrations for surface soils. No further threat to human health, ecological receptors, or background groundwater quality remains at this site. No additional actions are anticipated at the Day Care Center.

9.4 Cleanup Standards

Cleanup standards were established to protect human health, ecological receptors, background groundwater quality, and beneficial uses. Cleanup standards protective of human health are risk-based standards to reduce the incremental risk at a site to 1 x 10 -6. Cleanup standards to protect ecological receptors were developed with input from the U.S. EPA. Cleanup standards for groundwater are based on beneficial use limits (e.g., Maximum Contaminant Levels [MCLs]). Cleanup standards to protect background water quality were developed through vadose zone modeling and equilibrium partitioning limits developed in the RI/FS (Montgomery Watson, 1996a). This water quality assessment is summarized in Table 6-9. Appendix F documents the review of analytical laboratories to identify the lowest concentrations that can be reproducibly detected as verified by the use of a low-level standard. Where appropriate these concentrations were adopted as cleanup standards.

9.5 OU 1 Groundwater

9.5.1 The selected remedy for OU 1 includes extraction wells, air stripping to remove VOCs, wellhead carbon treatment to remove dieldrin, and reinjection. The primary disposal method is to discharge extracted and treated groundwater to shallow aquifers utilizing injection wells and infiltration galleries located on the main base property. DDJC-Tracy will construct additional subsurface disposal facilities in these areas or on the northern Annex property, as necessary, to optimize the capacity of the groundwater recharge disposal method. DDJC-Tracy will also install a blind flange in the discharge piping so that continued discharge to the storm water detention pond is no longer possible. As a back-up disposal method after optimization of all available subsurface disposal systems, treated groundwater may be discharged to the on-site wastewater evaporation/percolation ponds in cases of emergency. An "emergency" is defined as conditions such as failure of piping or capacity problems such that discharge to groundwater is not possible, as jointly determined by DDJC-Tracy and the regulatory agencies. The remedy addresses groundwater contaminated with TCE, PCE, 1,1-DCE, and dieldrin.

9.5.2 OU 1 is defined as the contaminated groundwater plume, on and off the depot, that is emanating from DDJC-Tracy. This plume of contamination is primarily identified by concentrations of PCE and TCE. In August 1993, the final OU 1 ROD (WCC, 1993b) was signed to implement the remedial alternatives presented in the OU 1 RI/FS (WCC, 1992b). The OU 1 ROD established aquifer cleanup standards for PCE, TCE, and 1,1-DCE. Groundwater from the OU 1 plume is currently being extracted and treated by the Interim Remedial Measure (IRM) system (Figure 9-1). The present worth cost to construct and operate the IRM system to address volatile organic compounds (VOCs) is estimated at $9.5 million.

9.5.3 As part of the OU 1 full-scale design, the feasibility of decreasing the OU 1 cleanup standards to detection limits was analyzed. This analysis was required by the OU 1 ROD (WCC, 1993). Modeling results showed that it is technically and economically infeasible to reduce OU 1 cleanup standards from aquifer cleanup standards to detection limits. This conclusion was documented in the Explanation of Significant Differences (ESD) to the OU 1 ROD, which was approved by parties to the FFA on 29 January 1996 (Montgomery Watson, 1996g). The ESD modified the selected remedy for OU 1 from extraction, treatment, and reinjection to a combination of extraction, treatment, reinjection, and dispersion (dispersion is limited to the TCE and PCE plume east of Banta Road).

9.5.4 The OU 1 ROD deferred remedial decisions for other constituents detected in groundwater to the Comprehensive RI/FS. Table 7-1 lists minimum and maximum concentrations detected, the frequency of detection, the remedial decision, the remedial decision rationale, and the potential risks for each constituent detected in groundwater at DDJC-Tracy. Table 7-1 shows that except for TCE, PCE, 1,1-DCE, and dieldrin, groundwater contaminants do not warrant remedial action because they were detected infrequently and/or below beneficial use limits (e.g., MCLs) or background levels. Dieldrin concentrations above the California Action Level of 0.05 Ig/L were detected near SWMUs 2, 3, and 8, and within the Tracy Annex. Concentrations of monuron and diuron in OU 1 groundwater are well below the numerical beneficial use limit (Table 7-1) of 10 Ig/L. Removal actions have been performed to excavate contaminated soils from the primary source area for monuron and diuron (SWMUs 2 and 3). Neither compound was detected in confirmation soil samples.

9.5.5 A thorough analysis of the Applicable or Relevant and Appropriate Requirements (ARARs) is presented in Section 10.3. All chemical-specific ARARs were reviewed and the most stringent were adopted as cleanup standards for the aquifer. The cleanup standard for dieldrin is based on the California Action Level (a chemical-specific performance standard). Attainment of background levels is not technically or economically feasible. Aquifer cleanup standards for groundwater at DDJC-Tracy are provided in the in-text table, below.

Analytes	Aquifer Cleanup Standards (Ig/L)	Basis
1,1-Dichloroethene	6.0	California MCL
Tetrachloroethene	5.0	Federal MCL
Trichloroethene	5.0	Federal MCL
Dieldrin	0.05	California Action Level

9.5.6 The OU 1 ESD revised and expanded the ROD-specified effluent treatment standards to include total chromium, DDD, DDE, DDT, chlordane, monuron and diuron. The effluent treatment standards for monuron and diuron were based on limited data from the initial background study. No monuron or diuron has been detected in the background wells at DDJC-Tracy. The prior monthly median values of 0.17 Ig/L for monuron and 0.15 Ig/L for diuron were derived from the detection limits for the A Horizon during the background study. This study employed a modified method and the detection limits for the A and B Horizons varied (Radian, 1997) because the detection limits were not reproducible. Therefore, this ROD proposes raising the effluent treatment standard for these compounds to the minimum concentration that can be reproducibly detected, as verified by the use of a low-level standard (see Appendix F). Modified effluent treatment standards are provided in the in-text table, below.

9.5.7 The existing OU 1 groundwater treatment system includes 11 extraction wells, an air stripper, and an infiltration gallery. The system operates at a capacity of 350 to 470 gallons per minute (gpm). The system is presently being expanded to add 24 new extraction wells, a larger treatment plant (air stripper), and nine new infiltration galleries. The operating capacity of the expanded system is estimated to be 1,250 gpm (Montgomery Watson, 1996f). To address pesticide contamination, the current OU 1 design includes wellhead treatment at extraction wells EW-02 and EW-05 with liquid-phase carbon.

Analytes	Treated Effluent Monthly Median (Ig/L)	Treated Effluent Daily Maximum (Ig/L)
Carbon Tetrachloride	0.5	0.5
Chloroform	0.5	5.0
Chromium (total)	50	50
1,1-Dichloroethene	0.5	5.0
Tetrachloroethene	0.5	5.0
Trichloroethene	0.5	5.0
Dieldrin	0.05	0.1
4,4-DDD	0.15	1.0
4,4-DDE	0.1	1.0
4,4-DDT	0.1	1.0
Chlordane	0.104	0.25
Monuron	1.0	1.0
Diuron	1.0	1.0
Total Volatile Organic Compounds (VOCs)	1.0	5.0

9.5.8 Alternative 3 (groundwater extraction and treatment) is the selected remedy for dieldrin in groundwater in OU 1. The components of the selected remedy for dieldrin will be added to the remedy of the OU 1 ROD to address all COCs in groundwater. The area recommended for remediation contains dieldrin concentrations near SWMUs 2, 3, and 8, and within the DDJC-Tracy Annex north of SWMUs 2 and 3. The selected aquifer cleanup standard for dieldrin is consistent with the effluent treatment standard for dieldrin selected for the full-scale OU 1 groundwater treatment system.

9.5.9 Groundwater modeling was performed to prepare the conceptual design. The groundwater model assumed that the removal actions will be completed at SWMUs 2 and 3, and a remedial action (Section 9.6.4) will be completed at SWMU 8. The groundwater modeling indicates that it is not technically feasible to meet the aquifer cleanup standard for dieldrin within 30 years. The modeling predicts that the aquifer cleanup standard can possibly be attained at SWMUs 2 and 3 within 50 years, and at SWMU 8 in 30 to 50 years. However, the groundwater modeling predicts that aquifer cleanup standards cannot be attained at the Annex within 50 years. The use of additional extraction wells is not expected to reduce the time required to reach the aquifer cleanup standard because dieldrin is relatively immobile and the capture of concentrations above the proposed cleanup standard is difficult to achieve. Although the cleanup standard of 0.05 Ig/L cannot be achieved within a 30 year time frame (in accordance with interim Final Guidance for conducting Feasibility Studies Under CERCLA [U.S. EPA, 1988]), DDJC-Tracy will take action.

9.5.10 The selected remedy for dieldrin consists of installing groundwater extraction wells in the following areas: SWMUs 2 and 3 (one well), SWMU 8 (two wells), and the Annex (at least four wells). Two existing extraction wells at SWMUs 2 and 3 (EW02 and EW05) will also be used to remediate dieldrin. Figure 9-2 shows proposed extraction well locations and the area of groundwater to be remediated. Each extraction well will be completed in the Above Upper Horizon and is expected to produce approximately 5 gpm. Extracted water will be treated with liquid phase granular activated carbon (GAC) to remove dieldrin, VOCs, and semivolatile organic compounds (SVOCs)/pesticides in the extracted groundwater.

9.5.11 Given the relatively low groundwater extraction rates expected from the additional extraction wells, it is anticipated that the infiltration galleries included in the OU 1 full-scale design will be sufficient to handle the additional groundwater flows from SWMUs 2 and 3 and within the Tracy Annex. Because SWMU 8 is located approximately 1,500 feet from the nearest OU 1 infiltration gallery, it is proposed that treated groundwater at this site be injected. Although fouling of injection wells has previously occurred, properly designed injection systems (i.e., galleries), combined with operation and maintenance (O&M)(including regularly scheduled re-development), are proposed as an appropriate and cost-effective means for managing treated water.

9.5.12 A five-year policy site review will be required for the OU 1 groundwater treatment system because it will take more than five years to attain the aquifer cleanup standard for dieldrin. However, the five-year policy review for the OU 1 treatment system will be postponed to correspond with the review of all other sites at DDJC-Tracy. This postponement will put all decision-making on a single five-year cycle. Five-year reviews will evaluate the performance of the selected remedy and be continued for as long as cleanup standards are exceeded. Groundwater sampling within the plume areas will be conducted as part of the Well Monitoring Program (see Table 9-2).

9.5.13 The selected remedy is protective of human health and the environment because dieldrin, other pesticides, and VOCs are removed from the groundwater, and because the treated groundwater is returned to the aquifer for use. Future risk to off-depot residents and depot workers is addressed by the selected remedy. The risk to off-depot residents is from carbon tetrachloride (71 %) and TCE (29%). Carbon tetrachloride has been detected infrequently in on-depot wells. Most of the carbon tetrachloride in groundwater was not related to depot activities (Montgomery Watson, 1996a). TCE will be removed by the selected remedy. On depot, the remedy will address dieldrin, which is responsible for 55 percent of the cancer risk. The remedy also addresses 1,1-dichloroethene (38% of the cancer risk) and chloroform (7% of the cancer risk). The potential incremental cancer risk above background to future depot workers will be reduced to 3.83x10 -4 (this is equivalent to the risk associated with the COCs at their corresponding MCLs). The estimated present worth of the selected remedy for dieldrin is $2,528,000. The basis for this cost estimate is included in Table 9-3. The total cost to address all COCs in groundwater (VOCs and dieldrin) has a 30-year present worth cost of approximately $12 million.

9.6 Group A Sites

9.6.1 The selected remedy (Alternative 3 - SVE) for the Group A sites addresses VOCs (TCE and PCE) in soils. The remedy focuses on VOCs at the following sites:

- SWMU 1/Area 2;
- Area 1 Building 237; and
- Area 3.

In addition to these sites, the northern portion of the Industrial Waste Pipeline (IWPL)(SWMU 33) in the immediate vicinity of Area 1 Building 237 (between manhole W-5 and SB463) will be further evaluated for VOCs in the predesign soil-gas sampling effort as part of the remedial design/remedial action effort. The soil-gas investigation will be extended from the specified locations as needed to identify the lateral and vertical extent of contamination above the numerical cleanup standards. The selected remedy will be implemented concurrently with the SVE system for SWMU 20, which addresses VOCs at SWMU 20, Area 1 Building 10, and the portion of the IWPL near Building 10.

9.6.2 The Group A sites do not pose potential risks to human health under the depot or construction worker exposure scenarios. No risks to ecological receptors have been identified. Vadose zone modeling (Montgomery Watson, 1996b) and groundwater data suggest that SWMU 1/Area 2, Area 1 Building 237, and Area 3 are continuing sources of VOCs to groundwater that would require the OU 1 treatment system to operate beyond 30 years.

9.6.3 A thorough analysis of ARARs for the selected remedy is provided in Section 10.4. The cleanup standards for the Group A sites are as follows:

Analytes	Group A Site Soil-Gas Cleanup Standards (Ig/L)
Tetrachloroethene	5.4 (780 ppbv)
Trichloroethene	1.9 (350 ppbv)

Although TCE has not been detected in soils at Area 1 Building 237, groundwater results suggest that this area could be a potential source area. Therefore, a cleanup standard for TCE was retained at this site. The SVE systems will address VOC concentrations above the cleanup standards.

9.6.4 PCBs (Aroclor 1260) were detected at a concentration of 140 mg/kg at 14.5 feet bgs in SB145 at SWMU 1/Area 2. Aroclor 1260 was not detected in any other soil samples collected at the site. Fate and transport modeling results show that the PCBs in soil at SB145 pose a threat to beneficial uses of groundwater. A hypothetical cost estimate was prepared assuming that the area of soil around boring SB145 where the PCBs were detected is to be remediated by excavation and disposal (Montgomery Watson, 1996a). The excavation would be approximately 15 feet by 15 feet by 15 feet for a total soil volume of 125 cy (165 tons). The total present worth cost for a removal action with Class 1 disposal of soil is $108,000. Although excavation and disposal is technically feasible, the cost expenditure required to remediate the small area of PCB-contaminated soil at SWMU 1/Area 2 is not considered justified given the relatively low level of contamination and the fact that PCBs were detected in only one soil sample.

9.6.5 The vadose zone cleanup will be achieved when:

1. The concentrations of PCE and TCE present in soil gas are equal to or less than the cleanup standard;

2. It is demonstrated that the remaining TCE and PCE can no longer cause leachate concentrations to exceed the aquifer cleanup standards; and

3. TCE and PCE have been removed to the extent technically and economically feasible. This evaluation will include, at a minimum, the following factors:

    a) The total cost and duration of continued operation of the SVE system until aquifer cleanup standards are met.

    b) The total cost and duration of continued groundwater treatment to meet aquifer cleanup standards without continued SVE operation.

    c) The incremental cost (cost benefit) of continued operation of the SVE system on the basis of a cost per pound of contaminant removal if the underlying groundwater has not attained aquifer cleanup standards.

9.6.6 The signatory parties to the ROD will jointly decide when the cleanup of volatile organic COCs in the vadose zone has been achieved and when the SVE system will be shut off permanently. The evaluation of technical and economic feasibility that will serve as the basis for this decision will be a primary document.

9.6.7 The signatory parties to the FFA agree that DDJC-Tracy may cycle the SVE system on and off to optimize the SVE operation and/or evaluate all feasibility analysis factors.

9.6.8 The selected alternative requires an SVE system to be installed in the area of contamination at each Group A site. Conceptual site layouts of the SVE systems for SWMU 1/Area 2, Area 1 Building 237, and Area 3 are shown in Figures 9-3, 9-4, and 9-5, respectively. Predesign soil-gas sampling will be performed at the areas designated for SVE remediation. This investigation will be expanded as needed to define the lateral and vertical extent of contamination above the soil-gas cleanup standard. The SVE systems will remove VOCs from the vadose zone. Depending on the extent of VOC contamination at each Group A site, an array of extraction wells will be installed and screened in the vadose zone. Approximately ten extraction wells will be required for SWMU 1/Area 2, five for Area 1 Building 237, and eight for Area 3 (Montgomery Watson 1996a). The radius of influence of the SVE wells is estimated to be 40 feet based on the soil lithology. The number of SVE wells will be modified as necessary to address the extent of contamination associated with the northern portion of the IWPL (centered between manhole W-5 and SB-463), SWMU 1 /Area 2, Area 1 Building 237, and Area 3. Additional SVE wells or optimization techniques will be used to address all soil-gas concentrations above the cleanup standard.

9.6.9 An SVE system, including a treatment pad and piping to connect the wells to a mobile blower system, will be installed at each Group A site. Air extracted from the SVE wells will be treated with vapor-phase GAC before discharge to the atmosphere. Techniques other than cycling the system will be evaluated as needed to achieve the cleanup standard. It is assumed that each SVE system will operate continuously for only six months because of the low mass of VOC contamination.

9.6.10 The selected remedy includes continued groundwater monitoring to evaluate the performance of the selected remedy (see Section 9.1 and Table 9-2).

9.6.11 Conventional drilling equipment can be used to install the SVE wells. Treatability studies may be required before full-scale implementation to increase the accuracy of the design parameters (e.g., SVE well radius of influence and blower specifications).

9.6.12 The estimated costs to implement SVE and to achieve soil-gas cleanup levels at each Group A site include installing air extraction vents, renting mobile SVE systems (including vapor-phase GAC treatment units), piping, and soil-gas confirmation sampling (less expensive and more accurate than soil sampling). The present worth of the treatment systems for the Group A sites is $266,000 (SWMU 1/Area 2), $140,000 (Area 1 Building 237), and $242,000 (Area 3). The total cost for all Group A sites is $648,000. The basis for these cost estimates is included in Tables 9-4, 9-5, and 9-6, respectively.

9.7 Group B Sites

9.7.1 SWMU 4 - Storm Drain Lagoon

9.7.1.1 Alternative 3 (Limited Excavation and Disposal) is the selected remedy for SWMU 4. SWMU 4 is a storm water detention pond that collects all storm water runoff from DDJC-Tracy through a network of underground storm drains and open surface drainage ditches. SVOCs (PAHs), pesticides, and metals have been detected in the lagoon sediment and subsurface soil (see Appendix C). Selenium, lead, and OC pesticides pose a threat to ecological receptors. Human health is not threatened under the depot worker or construction worker scenario.

9.7.1.2 Because the concentrations of contaminants in the sediment and the soil beneath the storm water pond do not indicate a current threat to groundwater quality, no further action to protect groundwater quality is warranted at SWMU 4. Four points support this conclusion.

9.7.1.3 First, the October 1996 subsurface sampling results (not included in the RI/FS) show that migration from the surface sediment to the subsurface soil is minimal. The analysis of these results modifies the conclusions of the RI/FS (Montgomery Watson, 1996a). The concentrations and numbers of analytes that exceed background or cleanup concentrations are much lower in the soil samples collected at 1 to 1.5 feet below the bottom of the pond than in the sediment samples collected from 0 to 6 inches below the bottom of the pond. The compounds that are present in the soil at concentrations greater than background levels (DDD and the PCB Arochlor 1260) have not been detected in groundwater samples from downgradient monitoring wells (LM004AU and LM027AUA). Dieldrin was detected above the practical quantitation limit (3 Ig/kg) in only one soil sample collected from deeper than 6 inches.

9.7.1.4 The data from fourteen surface sediment samples (0 to 6 inches below the bottom of the pond) collected during the remedial investigation (Montgomery Watson, 1996) and 18 subsurface soil samples collected above the water table (1 to 1.5 feet below the bottom of the pond)(Radian, 1996e) indicate that the number of compounds and their concentrations decrease with depth beneath the storm water pond (see Appendix C. The surface sediment samples had one to five SVOCs reported; however, no SVOCs were reported in the subsurface soil samples. One PCB (Arochlor 1260) was detected in eight surface sediment samples at concentrations of 41 to 459 Ig/kg; however, this contaminant was only detected in 1 of the 18 subsurface soil samples (at a concentration of 160 Ig/kg).

9.7.1.5 No urea-carbonate pesticides or chlorinated herbicides were reported in the subsurface soil samples. The pesticide DDD was detected in all the surface sediment samples at concentrations of 31 to 2,310 Ig/kg. Although this compound was detected in 14 of the 18 subsurface soil samples from 1 to 1.5 feet below the bottom of the pond, the concentrations ranged from 1.5 to 380 Ig/kg, and only four samples had concentrations above background soil concentrations (28.1 Ig/kg). The concentrations of DDT, which were detected in four subsurface soil samples, and DDE, detected in ten subsurface soil samples, were all less than the background soil concentrations of 2,565 Ig/kg and 1,284 Ig/kg, respectively. Dieldrin was reported in four surface sediment samples and four subsurface soil samples; however, the highest reported concentration in the subsurface soil (6.5 Ig/kg) was lower than the lowest concentration in the surface sediment samples.

9.7.1.6 Second, the de-ionized water waste extraction test (DI-WET) results for subsurface soils do not indicate any confirmed impacts to water quality. One subsurface soil sample that had measurable concentrations of DDE (73 Ig/kg), DDD (380 Ig/kg), DDT (1.1 Ig/kg), and dieldrin (2.7 Ig/kg) was subjected to the DI-WET to determine what fraction of the compounds may be leachable. Analyses of the leachate from the sample only showed reportable concentrations of DDE (0.13 Ig/L) and DDD (1.1 Ig/L. DDT and dieldrin concentrations were below reporting limits in the leachate. Although the leachate results suggest that there is potential for the frequently reported DDD and DDE to affect groundwater adversely, neither DDD nor DDE has been reported in any groundwater samples collected from LM004AU and LM027AUA, the downgradient monitoring wells.

9.7.1.7 Third, only dieldrin has been detected in both surface sediment and subsurface soil samples and in downgradient monitoring wells. Only dieldrin (one of six samples from LM004AU and one of 11 samples from LM027AUA), monuron (two of four samples from LM027AUA, and none from LM004AU), diuron (one of two samples from LM004A, and three of four from LM027AA), simazine (one of one from LM027AUA), and manganese (one of one from LM027AUA) detections have indicated any adverse impact on groundwater. However, dieldrin is the only one of these compounds reported in the groundwater samples that was also reported above background levels in the surface sediment or subsurface soil samples from the pond.

9.7.1.8 Finally, dieldrin has not been measured in downgradient monitoring wells since 1994. Dieldrin has been detected in one of six LM004AU groundwater samples and one of 11 LM027AUA samples. In July 1993, a dieldrin concentration of 0.011 Ig/L was measured at LM004AU. In 1995 and 1996, all dieldrin results were below the reporting limit of 0.10 Ig/L. Between 1987 and 1993, dieldrin concentrations at LM027AUA ranged from less than 0.005 Ig/L (detection limit) to 0.11 Ig/L. All dieldrin results were less than the reporting limit (0.1 Ig/L) in 1995 and 1996.

9.7.1.9 In conclusion, the surface sediment, subsurface soil, soil leachate, and groundwater results suggest that SWMU 4 is not now, and is unlikely to be in the future, a source of groundwater contamination. Although there has been an almost constant downward driving force of standing storm water in the pond, contaminants have not been leached into the groundwater at levels that would cause groundwater concentrations to exceed background levels during the 25 years that the pond has been used. The groundwater analyses do not indicate conclusively that the dieldrin, monuron, and diuron detected in the groundwater samples can be attributed to the storm water pond. There is no clear evidence that the remediation of the soil at this site would have any effect on groundwater quality. This analysis modifies the conclusions of the RI/FS.

9.7.1.10 The cost of excavating all surface sediment and subsurface soils with analyte concentrations that could potentially impact background groundwater quality (based on equilibrium partitioning limits) is estimated as $700,000. The above analysis shows that the benefits associated with excavation to protect groundwater quality at SWMU 4 are doubtful, and funding excavation to address unlikely groundwater impacts is not warranted at this site. Therefore, the selected remedy is based on cleanup standards to protect ecological receptors.

9.7.1.11 A thorough analysis of ARARs is provided in Section 10.5.2. Sediment cleanup standards for SWMU 4 were developed from ecological assessment results (see Appendix D). The cleanup standards are:

Analytes	SWMU 4 Cleanup Standards (Ig/kg)
Total DDX	241
Lead	5,130
Selenium	616

Preliminary standards: see discussion below.

9.7.1.12 Cleanup standards for total DDX, lead, and selenium are risk-based concentrations (see Section 6.6.5). These standards were estimated using literature values rather than site-specific bioaccumulation factors. Additional data will be collected to obtain site-specific bioaccumulation factors, and to evaluate the effects of the sediment on surface water. These cleanup standards and the extent of excavation will be evaluated and revised as jointly determined by DDJC-Tracy and the agencies. Any modification of the cleanup standards will be made through an explanation of significant differences to this ROD.

9.7.1.13 In addition to the cleanup standards identified for sediments, any discharge from SWMU 4 to the local irrigation canal must meet the freshwater chronic ambient water quality criteria (AWQC) for protection of aquatic life (U.S. EPA, 1988). Samples collected in early October 1994 exceeded the freshwater chronic AWQC for DDT (1.0 x 10 -3 Ig/L) and dieldrin (1.9 x 10 -3 Ig/L). The following standards for storm water discharge will be applied.

Analytes	Storm Water Discharge Standards
DDT	0.1*
Dieldrin	0.05*

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.1.14 The storm water pond will only receive storm water. It is uncertain if the storm water discharge will exceed the AWQC; however, the concentrations will be confirmed by sampling (under the storm water pollution prevention program) at least two discharge events per year (the first event of the year and one other) for the next five years and evaluated in the first five-year review. The potential carryover of sediment from the pond will also be evaluated. If contaminants (filtered and unfiltered water samples) exceeding the discharge standard or contaminated sediment are found in the discharge, DDJC will evaluate and identify an appropriate modification of the selected remedy (e.g., additional excavation, sediment traps, etc.) to achieve the discharge requirements.

9.7.1.15 The selected remedy includes dewatering the storm drain lagoon, construction of a sediment trap at the northern inlet and an overflow weir for discharge to surface water at the outlet, excavating sediment contaminated with pesticides and selenium (Figure 9-6), and transporting the sediment to a disposal facility (Class II municipal facility is anticipated) for disposal. The need for additional sediment controls on the southern inlet will be evaluated. Sediment samples will be collected for analysis during the remedial action to ensure that sediment remaining across the bottom of the lagoon does not exceed the risk-based concentrations for DDD, DDE, DDT, and selenium that are protective of ecological receptors or cause any discharge from SWMU 4 to exceed the AWQC for the protection of aquatic life. The excavated sediment should not be considered a listed hazardous waste under RCRA.

9.7.1.16 Groundwater sampling for SVOCs and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. Lead and selenium are potential threats to ecological receptors only and do not post a threat to groundwater quality. As stated in Section 9.1, concentrations of COCs exceeding the following concentrations will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Bis(2-ethylhexyl)phthalate	10*
Carbaryl	60
Carbofuran	18
Chlordane	0.1*
2,4-D	70
Dieldrin	0.05*
Fluoranthene	280
Phenanthrene	10
Pyrene	210

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.1.17 At a date to be agreed upon, far enough in advance of the 5-year CERCLA review meeting so that relevant information can be presented, DDJC Tracy will collect and analyze sediment samples from SWMU 4 for the pesticides of concern. If pesticide levels are not found to be protective of the ecological receptors, DDJC Tracy will take action to restore the ecological protectiveness level in the sediment. This action, depending on the consensus of the group, could be performed under CERCLA or some other program, such as the Storm Water Protection Program. In either case DDJC would agree to install sediment traps on the inlet to the storm water detention pond to prevent any future buildup of sediments if the selected remedy does not demonstrate adequate permanence.

9.7.1 .18 The selected remedy reduces the toxicity and volume of sediment and surface water COCs at the site because it removes the contaminated sediment from the storm drain lagoon. The selected remedy is protective of human health and the environment. Because the storm drain lagoon will remain in service as part of the DDJC-Tracy storm water system, the appropriate best management practices, as identified in the DDJC-Tracy Storm Water Pollution Prevention Plan, will be used to ensure that future storm water pollution is minimized. The present worth cost of this alternative is estimated at $855,520. The basis for this cost estimate is included in Table 9-8.

9.7.1 SWMU 6 - Building 28 Sump

9.7.2.1 Alternative 4 (Excavation and Disposal) is the selected remedial alternative for SWMU 6. SWMU 6 consisted of a 250-gallon concrete sump located on the west side of Building 28; this building was used to repackage materials from damaged containers. Wastes from this recoup operation were collected in the concrete sump, pumped into 55-gallon drums, and then removed to a Class I or other disposal site. The sump was removed in 1977; an asphalt patch at the site marks the location of the excavation. RI results indicate that pesticide and herbicide contamination in the soil is limited to the area immediately adjacent to the sump excavation and from depths below the sump excavation to directly above the water table. The Baseline Risk Assessment (BRA) results show no potential human health or ecological risks at SWMU 6. Vadose zone modeling results indicate that pesticides (dicamba, dieldrin, endrin, heptachlor, 2,4,5-T, and lindane) pose a potential threat to background groundwater quality. Thus, the recommended alternative will permanently remove the potential threat posed to groundwater by pesticides in the soil.

9.7.2.2 A thorough evaluation of ARARs is provided in Section 10.6.2. Cleanup standards for SWMU 6 were developed from vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards were developed to protect background groundwater quality to levels consistent with Water Quality Goals (CVRWQCB, 1993). The proposed cleanup standards are:

Analytes	SWMU 6 Cleanup standards (Ig/kg)
Dicamba	10
Dieldrin	3
Endrin	3
Heptachlor	1.5
Lindane	1.7
2,4,5-T	5

9.7.2.3 The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentration expected in soil pore water and do not account for an expected decrease in concentration resulting from migration through less contaminated or clean soils to groundwater (see Figure B-11). Furthermore, only lindane has impacted groundwater at SWMU 6 to date. Because of these factors, it was considered appropriate to use a laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard (Appendix F). This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.2.4 The selected remedy includes excavating approximately 100 cy of soil contaminated with pesticides from SWMU 6 (Figure 9-7). Confirmation samples will be collected to ensure that cleanup standards will be achieved. A natural gas line at the site must be taken out of service during the excavation. Approximately 60 cy of soil will be transported to a Class I or Class II off-site disposal facility, depending on the level of contamination. Clean soil imported from off-site will be used to backfill the excavated areas.

9.7.2.5 Groundwater sampling for SVOCs and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. As discussed in Section 9.1. concentrations of CCCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Dieldrin	0.05*
Dicamba	210
Endrin	2
Heptachlor	0.01*
Lindane	0.03
2,4,5-T	70

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.2.6 This alternative is protective of human health and the environment. It removes the threat to groundwater posed by the contaminated soil. The present worth of this alternative is $45,000 for Class II disposal or $65,000 for Class I disposal. The basis for these cost estimates is included in Tables 9-9 and 9-10.

9.7.3 SWMU 7 - Burn Pit No. 1

9.7.3.1 Alternative 2 (Institutional Controls) is the selected remedy for SWMU 7. SWMU 7 consists of a total of seven reported pits that were operated before the construction of the warehouse and buildings at the site. The pits were used for the disposal of medical supplies, narcotics, general pharmaceuticals, radiological supplies, and electron tubes. The pits may have been up to 16 feet deep; ashes were removed and transported to off-site landfills during the later years of operation (WCC, 1992a). BRA results show no potential risks to human or ecological receptors. Vadose zone modeling results indicate that total petroleum hydrocarbons as diesel (TPHD) in Pit D, VOCs in Pit F, SVOCs in Pit C, and pesticides and herbicides (2,4-D, linuron, dieldrin, and simazine) detected in SWMU 7 soils may pose a threat to background groundwater quality uses at two of the pits; however, this threat has not been confirmed by the results of groundwater monitoring conducted to date. Because portions of the seven pits are covered by buildings and groundwater contamination is not present at the site, institutional controls appear warranted as the recommended alternative. By covering portions of the pits, the building foundations prevent adverse exposure to receptors and mitigate groundwater threats by reducing rainwater infiltration.

9.7.3.2 A thorough evaluation of ARARs is provided in Section 10.7.2. Cleanup standards for SWMU 7 were developed from vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards were developed to protect background groundwater quality to levels consistent with Water Quality Goals (CVRWQCB, 1993). The proposed cleanup standards are:

Analytes	SWMU 7 Cleanup standards (Ig/kg)
1,2-Dichloroethene (Pit F)	10
Trichloroethene (Pit F)	5
Bis(2-ethylhexyl)phthalate (Pit C)	330
2,4-D	25
Dieldrin (Pit C and D)	3
Linuron (Pit C and D)	200
Simazine (Pit D)	10
TPH as diesel (Pit D)	100,000

9.7.3.3 The TPHD cleanup standard was developed from the Tri-Regional Guidelines. The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentration expected in soil water and do not account for an expected decrease in concentration resulting from migration through less contaminated or clean soils to groundwater (Figures B-12 and B-13). Furthermore, of the COCs, only bis(2-ethylhexyl)phthalate has been detected in groundwater at SWMU 7 to date. Because of these factors, it was considered appropriate to use a laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard (Appendix F). This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.3.4 The selected remedy includes the following components:

- The real property records for Buildings 19 and 21 will be modified such that the signatory parties to the ROD must be contacted at least one month before any demolition or construction activities that could expose contaminated soil. The DDJC-Tracy Master Plan designates this area for industrial use only.

- Two additional monitoring wells will be installed downgradient from SWMU 7 (see Figure E-2).

- Groundwater will be monitored for as long as contaminants remain in place with concentrations that could threaten groundwater quality or until it can be demonstrated that no further threat to groundwater quality exists.

9.7.3.5 The selected remedy includes land use restrictions around the disposal pits (at Buildings 19 and 21) where concentrations of pesticides and other COCs have been detected. If ownership of the installation is transferred to private or nonfederal entities in the future, restrictive covenants, written into the land property deed, could be established that would prevent schools, playgrounds, hospitals, and housing from being built at the sites until COCs are below levels of concern. Cooperation among the U.S. Army, San Joaquin County, and Cal-EPA will be required to enact the restrictions on access and land use.

9.7.3.6 Two new wells will be installed as part of the selected remedy (Figure E-2). One of the additional wells will be monitored for SVOCs and both wells will be monitored for Organophosphorus (OP) pesticides, OC pesticides, chlorinated herbicides, and carbamate/urea pesticides annually. In addition, both new wells will be monitored for dioxins/furans (unconfirmed chemicals of potential concern) semiannually for one year. Monitoring for dioxins/furans in the two new wells was incorporated into the selected remedy in lieu of performing additional investigation activities at SWMU 7. The new wells will be sufficient to assess any groundwater contamination emanating from the burn pits without performing additional monitoring of LM43A. Monitoring of LM095AU will be continued as part of the selected remedy.

9.7.3.7 Groundwater sampling for SVOCs and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. As discussed in Section 9.1, concentrations of COCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
1,2-Dichloroethene (Pit F)	6
Trichloroethene (Pit F)	2.3
Bis(2-ethylhexyl) phthalate (Pit C)	10*
Linuron	2*
2,4-D	70
Simazine	4
Dieldrin (Pit C and D)	0.05*
TPH as diesel	100
Total dioxins/furans	0.01*

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.3.8 At least two additional consecutive rounds of groundwater monitoring for dioxins/furans are required as part of the selected remedy. This monitoring and interpretation was agreed upon as a substitute for extending the remedial investigation. The potential threat to groundwater from dioxins/furans will be reevaluated in the first five-year CERCLA review.

9.7.3.9 Five-year site reviews are required by the CERCLA guidance because contaminants will be left in place.

9.7.3.10 Institutional controls do not reduce the toxicity, mobility, or volume of the COCs in the soils. The selected remedy is protective of human health under current land use conditions, and because it implements land use restrictions, it is also protective of human health under future land use conditions. The present worth of this alternative is $208,000. The basis for this cost estimate is included in Table 9-11.

9.7.4 SWMU 8 - Burn Pit No. 2

9.7.4.1 Alternative 4 (Excavation and Disposal) is the selected remedy for SWMU 8. SWMU 8 is a single large burn pit that is approximately 16 feet deep, 250 feet long, and 30 feet wide. Phthalates, PAHs, pesticides, petroleum hydrocarbons, dioxin/furans, and metals have been released to the soil from disposal activities associated with SWMU 8. In general, the elevated concentrations of these constituents are limited to the middle fill horizon (starting at approximately 4 feet below ground surface [bgs]) and the lower fill horizon (down to groundwater) of the central and northern portion of the pit. The BRA results indicate that OC pesticides (chlordane, DDD, DDE, DDT, and dieldrin) detected in soil at SWMU 8 could pose potentially significant risks to future construction workers. The selected remedy would remove the contaminated soils that contribute to a risk in excess of 1x10 -6. The hazard index at this site would be approximately 8 following remediation, but this level reflects that the presence of manganese (upper confidence limit [UCL] is 630 mg/kg) is below the background threshold concentration (805 mg/kg). The selected remedy is therefore considered protective of human health under current and future land use conditions.

9.7.4.2 The vadose zone modeling results for SWMU 8 indicate that SVOCs, pesticides/herbicides, and petroleum hydrocarbons detected in deep soils could migrate to groundwater and potentially threaten background groundwater quality. SWMU 8 is considered a primary source area of dieldrin contamination in groundwater. In addition, the levels of total petroleum hydrocarbons as gasoline (TPHG), TPHD and total petroleum hydrocarbons as motor oil (TPH-MO) in soil at SWMU 8 are above the State Water Resources Control Board (SWRCB) Tri-Regional Guidelines of 1,000 Ig/kg, 10,000 Ig/kg, and 10,000 Ig/kg, respectively, for TPH within five feet of groundwater.

9.7.4.3 A thorough evaluation of ARARs is provided in Section 10.8.2. Cleanup standards for SWMU 8 were developed using risk-based concentrations and vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards developed to protect background groundwater quality are consistent with Water Quality Goals (CVRWQCB, 1993) and SWRCB Tri-Regional Guidelines. The proposed cleanup standards are:

Analytes	SWMU 8 Cleanup Standards (Ig/kg)
Total chlordane	10
2,4-D	25
DDD	81
DDT	7
Total DDX	30,000
Dieldrin	2
Lindane	1.7
Linuron	200
MCPA	5,000
Simazine	10
bis(2-ethylhexyl)phthalate	330
Diethylphthalate	330
2,4-Dinitrotoluene	330
Naphthalene	330
TPH as gasoline	1,000
TPH as diesel	10,000
TPH as motor oil	10,000

9.7.4.4 The basis for the soil cleanup standards for DDD and DDT is the calculated equilibrium partitioning limit developed in the RI/FS (see Table 6-9 for summary) that is protective of beneficial uses. The cleanup standard for total DDX is a risk-based concentration corresponding to increased lifetime cancer risk of 1X10 -6. The soil cleanup standards for TPHG, TPHD, and TPH-MO were determined using the scoring criteria of the Tri-Regional guidance.

The basis for the soil cleanup standards for 2,4-D, bis(2-ethylhexyl)phthalate, naphthalene, total chlordane, dieldrin, lindane, linuron, MCPA, simazine, diethylphthalate, and 2,4-dinitrotoluene is the analytical method reporting limit. The equilibrium partitioning limits provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentration expected in soil water and do not account for an expected decrease in concentration resulting from migration through less contaminated or clean soils to groundwater (Figures B-14 through B-16). Chlordane, DDD, DDE, and DDT have been detected in groundwater at SWMU 8 to date. The disposal area for these compounds is well defined, and soil will be excavated to the water table so all COCs will be addressed. Therefore, it was considered appropriate to use a laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard (Appendix F). This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.4.5 The selected alternative includes excavating approximately 8,000 cy (10,400 tons) of contaminated soil and debris from the burn pit at SWMU 8 (Figure 9-8). The soil and debris will be excavated to approximately 14 feet bgs (the limits of the disposal area are well defined). Soil will be removed to the approximate depth of the water table. From the COCs detected in SWMU 8 soils, it is assumed that 3,400 tons of contaminated soil will be disposed of at a Class I or other disposal facility in compliance with state and federal laws and regulations. Approximately 2,400 tons of debris (concrete, wood, etc.) will be disposed of at a Class III facility. Clean soil imported from off-site will be used to backfill the excavated areas. Excavation and disposal will permanently remove all known soil with contaminant concentrations above cleanup standards. Therefore, the selected alternative permanently prevents migration of any known soil constituents to groundwater (confirmation sampling is included in the remedy for VOCs to address remaining data gaps). Given the relatively high levels of contaminants in the former burn pit, construction workers should take necessary precautions to ensure worker health protection during soil excavation activities. In addition, the presence of buried debris in the former burn pit can make the excavation of the contaminated material difficult.

9.7.4.6 Confirmation sampling for the COCs and VOCs (soil gas) will be performed during site remediation. Sampling for VOCs has been agreed to by the signatory parties as a substitute for extending the remedial investigation at this site. The results of the confirmation sampling for VOCs will be included in the construction report. Further actions at SWMU 8 will depend on the magnitude of any VOCs reported. If VOC concentrations in soil-gas exceed the soil-gas cleanup standard, an explanation of significant differences will be required to evaluate remedial options.

9.7.4.7 Also included in the selected remedy for SWMU 8 is the installation of one new monitoring well (see Table 9-2). This well and the two existing wells (LM97A and LM119A) near the site will be monitored for OC pesticides over four quarters. This monitoring is included in the selected remedy because the dieldrin plume predicted to be in groundwater downgradient of the site by groundwater modeling has not been confirmed by historical groundwater monitoring results. It is assumed that the new monitoring well will be installed in the zone of highest concentrations of dieldrin at SWMU 8, approximately halfway between monitoring wells LM97A and LM119A. The new monitoring well will also be monitored for dioxins/furans semiannually for one year. If the dioxin/furan levels are above the water quality objectives, the Annual Well Monitoring Report will be used to develop a strategy for continued monitoring or further action, as needed.

9.7.4.8 Groundwater sampling for SVOCs and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. As stated in Section 9.1, concentrations of COCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Bis(2-ethylhexyl) phthalate	10*
Diethylphthalate	5,600
2,4-Dinitrotoluene	10*
Naphthalene	20
Chlordane	0.1*
2,4-D	70
DDD	0.15
DDE	0.1
DDT	0.1
Dieldrin	0.05*
Lindane	0.03
Linuron	2*
MCPA	380*
Simazine	4
Total dioxins/furans	0.01*
TPH as gasoline	50*
TPH as diesel	100
TPH as motor oil	100

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.4.9 The selected alternative reduces the toxicity and volume of all COCs in the soil at the site and is therefore protective of human health and the environment. The alternative also removes the threat posed to groundwater by the COCs in the soil. The present worth of this alternative is $2,823,000. The basis for this cost estimate is included in Table 9-12.

9.7.5 SWMU 20 - Aboveground Solvent Tank/Building 26 Recoup Operations and Area 1 Building 10

9.7.5.1 Alternative 3 (SVE, Excavation and Disposal, Natural Attenuation) is the selected remedy for SWMU 20 and Area 1 Building 10. SWMU 20 was an aboveground solvent tank located in Building 10. SWMU 20 also contains a 4-foot-by-5-foot sump (at Manhole W-1) located outside the northwestern corner of Building 10 and a 2-foot-by-3-foot sump (at Manhole W-3) located outside the northeastern corner of Building 10. VOCs and SVOCs were detected in sludges collected from the two sumps, the floor drain, and soil samples collected beneath these features. Area 1 of Building 10 is also located near the northeast corner of Building 10. Due to the proximity of Area 1 Building 10 to SWMU 20 and the similarity of the COCs at both locations, these sites were evaluated together in the RI/FS. The selected remedy also addresses potential VOCs associated with the southern portion of the IWPL in the immediate vicinity of SWMU 20 (between manholes W-1 and W-3 and the area between SB430 and SB432). The SVE portion of the remedy will be coordinated with the remedy for the Group A sites.

9.7.5.2 BRA results indicate that SWMU 20 and Area 1 Building 10 do not pose potential risks to human health under either the current depot worker or the future construction worker exposure scenarios. In addition, there are no ecological receptors at SWMU 20 and Area 1 Building 10. Thus, Alternative 3 is protective of human health under current and future land use conditions. Vadose modeling results show that VOCs, SVOCs, TPHD, and pesticides/herbicides could pose a threat to groundwater at the site.

9.7.5.3 The recommended alternative includes the excavation and disposal of the two sumps (at manholes W-1 and W-3) in the vicinity of Building 10 and the floor drain at Building 26 (Figure 9-9). Confirmation samples will be collected to ensure that cleanup standards are achieved. The soil beneath the sumps and the floor drain will also be excavated and disposed of. The excavated soil will be transported to a Class I or other off-site disposal facility. Clean soil imported from off-site will be used to backfill the excavated areas. Geotechnical concerns should be considered when excavating soils adjacent to Building 10. In addition, this alternative may disrupt underground utilities.

9.7.5.4 A thorough evaluation of ARARs is provided in Section 10.9.2. Cleanup standards for SWMU 20 were developed using vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards developed to protect background groundwater quality are consistent with Water Quality Goals (CVRWQCB, 1993) and the SWRCB Tri-Regional Guidelines. The proposed soil cleanup standards are:

Analytes	SWMU 20 Cleanup Standards (Ig/kg)
Trichloroethene	5
Ethylbenzene	5
Xylenes	5
Diethylphthalate	330
2,4-Dinitrophenol	830
Pentachlorophenol	830
2,4,6-trichlorophenol	330
Dieldrin	2
Methiocarb	500
Linuron	200
MCPA	5,000
TPH as diesel	10,000

9.7.5.5 The soil cleanup standard for TPHD was developed using the Tri-Regional Guidelines. The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentration expected in soil water and do not account for an expected decrease in concentration resulting from migration through less contaminated or clean soils to groundwater (Figures B-17 and B-18). Monuron, diuron, alpha-BHC, methiocarb, and 2,4-D have also impacted groundwater quality. These pesticides/herbicides were detected in sludges, but were not encountered at depth (Figure B-18). Significant dilution is therefore anticipated. Because of these factors, it was considered appropriate to use a laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard (Appendix F). This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.5.6 Groundwater sampling for VOCs, SVOCs, and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. As stated in Section 9.1, concentrations of COCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

9.7.5.7 SVE will be performed to remediate the TCE-contaminated soil detected at Area 1 Building 10 (near SB 108) and near SB431. SVE is expected to be effective in reducing TCE concentrations at these locations. Predesign soil-gas sampling will be conducted at the areas designated for SVE remediation at SWMU 20, the adjacent portion of the IWPL, and Area 1 Building 10. The investigation will be expanded from the identified areas as needed to define the lateral and vertical extent of contamination above the specified soil-gas cleanup standard. Additional SVE wells will be added as needed to address soil-gas concentrations in excess of the soil-gas cleanup standard.

9.7.5.8 The cleanup standard for TCE in soil gas is:

Analyte	SWMU 20 Soil Gas Cleanup Standard (Ig/L)
Trichloroethene	1.9 (350 ppbv)

9.7.5.9 This concentration will also be used to determine if it is necessary to evaluate further action to address the TCE associated with the IWPL between manholes W-1 and W-3 and between SB430 and SB432 (this area will be expanded as required to attain the soil-gas cleanup standard). The SVE systems will address VOC concentrations above the cleanup standards.

9.7.5.10 The vadose zone cleanup will be achieved when:

1. The concentrations of TCE present in soil gas are equal to or less than the cleanup standard;

2. It is demonstrated that the remaining TCE can no longer cause leachate concentrations to exceed the aquifer cleanup standards; and

3. TCE has been removed to the extent technically and economically feasible. This evaluation will include, at a minimum, the following factors:

    a) The total cost and duration of continued operation of the SVE system until aquifer cleanup standard are met.

    b) The total cost and duration of continued groundwater treatment to meet aquifer cleanup standards.

    c) The incremental cost (cost benefit) of continued operation of the SVE system on the basis of a cost per pound of contaminant removal if the underlying groundwater has not attained aquifer cleanup standards.

9.7.5.11 The signatory parties to the ROD will jointly decide when the cleanup of VOCs in the vadose zone has been achieved and when the SVE system be shut off permanently. The evaluation of technical and economic feasibility that will serve as the basis for this decision will be a primary document.

9.7.5.12 The signatory parties to the FFA agree that DDJC-Tracy may cycle the SVE system on and off to optimize the SVE operation and/or evaluate all feasibility analysis factors.

9.7.5.13 Phenols detected in the soil (SB432/432b) are anticipated to attenuate as they migrate to groundwater. The maximum concentration of phenols measured in the RI/FS (Montgomery Watson, 1996a) is less than five times the equilibrium partitioning limit. This limit does not account for any dilution of the soil water as a result of migration through less contaminated or clean soil. To date, phenols have not been detected in groundwater, although they are very mobile in sandy soils. They are known to form extremely stable complexes with clay particles, and these complexes could retard their mobility.

9.7.5.14 This alternative reduces the toxicity and volume of all COCs in the soil at the site. The threat of COC migration to groundwater will be removed immediately on completion of the excavation. The present worth of this alternative is $293,000. The basis for this cost estimate is included in Table 9-13.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Ethylbenzene	29
Xylenes	17
Trichloroethene	2.3
Tetrachloroethene	2*
Diethylphthalate	5,600
2,4-Dinitrophenol	50*
Pentachlorophenol	50*
2,4,6-Trichlorophenol	10*
Dieldrin	0.05*
Methiocarb	5
MCPA	380
Linuron	2*
TPH as diesel	100

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.6 SWMU 24 - Petroleum Waste Oil Tank

9.7.6.1 The selected remedy for SWMU 24 is Alternative 3 (Bioventing). SWMU 24 was a 500-gallon Underground Storage Tank (UST) that was used to store petroleum wastes from materials testing in Building 247 from 1961 to 1988. The UST was removed in 1988, and visibly contaminated soil from the excavation was disposed of off-site. During the Phase I and II investigations, xylenes, 2-butanone, MIBK, petroleum hydrocarbons, and other organic compounds were detected in soils in the vicinity of the tank excavation.

9.7.6.2 BRA results indicate that there is a potential health threat to future depot workers exposed to toluene at SWMU 24. The hazard index associated with indoor air is presently estimated at 0.7; however, if a building with poor ventilation were constructed over the contamination, the hazard index could potentially exceed 1.0. Bioventing will reduce toluene levels in soil and therefore is protective of human health under current and future land use conditions. Vadose zone modeling results for SWMU 24 show that VOCs, SVOCs, petroleum hydrocarbons, PCBs, and pesticides pose a threat to background water quality. Also, TPHG and TPHD levels in the soil are above the SWRCB Tri-Regional Guidelines of 1 mg/kg and 10 mg/kg, respectively, for TPH within five feet of groundwater.

9.7.6.3 A thorough evaluation of ARARs is provided in Section 10.10.2. Cleanup standards for SWMU 24 were developed using vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards developed to protect background groundwater quality are consistent with Water Quality Goals (CVRWQCB, 1993) and the SWRCB Tri-Regional Guidelines. The cleanup standards are:

Analytes	SWMU 24 Cleanup Standards (Ig/kg)
Acetone	10
2-butanone	10
Ethylbenzene	10
2-hexanone	10
4-methyl-2-pentanone	10
Toluene	5
Xylenes	5
2,4-dimethylphenol	330
Fluoranthene	330
2-methylnaphthalene	330
4-methylphenol	330
Naphthalene	330
Phenanthrene	330
Phenol	330
Pyrene	330
Carbofuran	500
Lindane	1.7
Phorate	20
Ronnel	35
Aroclor 1260	30
TPH as gasoline	1,000
TPH as diesel	10,000

9.7.6.4 Soil cleanup standards for TPHG and TPHD were developed using the scoring criteria of the Tri-Regional guidance. The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentrations expected in soil water and do not account for an expected decrease in concentrations resulting from migration through less contaminated or clean soils to groundwater (Figure B-19). Soil sampling data indicate that the concentrations and numbers of analytes detected generally decrease with increasing sampling depth. Significant dilution is therefore anticipated. Because of these factors, it was considered appropriate to use a laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard (Appendix F) as a basis for all other cleanup standards. This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.6.5 Bioventing (Figure 9-10) is expected to biodegrade the COCs that pose the greatest threat to groundwater. Therefore, the recommended alternative reduces the potential for migration of soil constituents to the groundwater and is protective of beneficial uses. PCBs and pesticides are not fully remediated during bioventing treatment because these compounds are not amenable to aerobic biodegradation. However, the threat to groundwater posed by PCBs and pesticides is considered low relative to the threat posed by the other COCs. Pesticide detections were infrequent, and none of the pesticides or PCBs detected in soil has been detected in groundwater near the site. PCBs were only detected in one boring (SB-192), and the concentrations of both PCBs and pesticides decreased with depth. Removing these compounds through excavation beside and under Building 247 would be expensive (approximately $263,000), and the threat to groundwater is questionable at this site. Therefore, groundwater monitoring for PCBs and pesticides is considered adequate to address the remaining threat to groundwater. Groundwater will be monitored as long as contaminants remain in place or until it can be demonstrated that no further threat to groundwater exists.

9.7.6.6 The extent of soil contamination is very limited at SWMU 24; thus, only a bioventing system consisting of one air injection well is necessary. The conceptual site layout for the bioventing system is shown in Figure 9-9. The selected alternative includes installing one air injection well and a pad-mounted blower system at SWMU 24. The well would be screened from 6 feet bgs to 16 feet bgs. An air injection rate of 0.5 pore volumes per day (Dupont, 1993) was assumed for the conceptual design. With this air injection rate, the total operating flow rate for the bioventing system will be approximately 4 standard cubic feet per minute (scfm). The bioventing system will be operated until the cleanup standards provided above have been achieved. Predesign soil-gas sampling will be conducted; pending the results of the soil-gas sampling, bioventing may be preceded by SVE (if VOCs resistant to biodegradation are measured).

The immediate implementation of SVE will be evaluated before bioventing if the following cleanup standards are exceeded.

Analytes	SWMU 24 Soil Gas Action Levels (Ig/L)
Tetrachloroethene	5.4 (780 ppbv)
Trichloroethene	1.9 (350 ppbv)

9.7.6.7 Groundwater sampling for VOCs, SVOCs, and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. As stated in Section 9.1, concentrations of COCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

9.7.6.8 The selected remedy for SWMU 24 also includes the quarterly monitoring of well LM118A for TPHG and TPHD for at least three quarters (Table 9-2). The purpose of this monitoring is to assess the natural attenuation of petroleum hydrocarbons in the groundwater.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Acetone	700
2-Butanone	4,200
Ethylbenzene	29
2-Hexanone	10
4-Methyl-2-Pentanone	40
Toluene	42
Xylenes	17
Trichloroethene	2.3
Tetrachloroethene	2*
TPH as gasoline	50*
TPH as diesel	100
Fluoranthene	280
2-Methylnaphthalene	10
4-Methylphenol	10
2,4-Dimethylphenol	140
Naphthalene	20
Phenol	4,200
Pyrene	210
PCBs (Arochlor 1260)	0.5
Carbofuran	18
Lindane	0.03
Phorate	0.5
Ronnel	0.5

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.6.9 The selected remedy reduces the toxicity, mobility, and volume of COCs in the soil at the site. This remedy is protective of human health and the environment. The threat posed by the migration of VOCs, SVOCs, and petroleum hydrocarbons to groundwater will be removed through the biodegradation of these constituents. The present worth of this alternative is $166,000. The basis for this cost estimate is included in Table 9-14.

9.7.7 SWMU 27 - Building 206 Roundhouse Sump and Area 1 Building 206

9.7.7.1 Alternative 3 (Excavation and Disposal) is the selected remedy for SWMU 27 and Area 1 Building 206. SVOCs, herbicides, PCBs, petroleum hydrocarbons, and metals have been released to soils as a result of activities associated with SWMU 27. The distribution of these constituents is primarily confined to the area within Building 206, mainly around the former service pit, the former waste oil sump, and the former floor drain located within Building 206. Building 206, which is part of SWMU 27, is no longer in use and was demolished in April 1995. The floor slab remains and the locomotive pit, service pit, and sump were filled with concrete.

9.7.7.2 BRA results indicate that there is a potential cancer risk greater than 1x10 -6 under the depot and construction worker exposure scenarios. The potential cancer risk is based on exposure to PAHs and PCBs. The selected remedy would reduce these risks to 1x10 -6 by excavating contaminated soils to the specified cleanup standards for total PAHs and Arochlor 1260. No ecological receptors were identified at SWMU 27. TCE, 2,4-D, MCPA, 2,4,5-T, and TPH-MO are potential threats to groundwater quality.

9.7.7.3 A thorough evaluation of ARARs is provided in Section 10.10.2. Cleanup standards for SWMU 27 were developed using risk-based concentrations and vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards developed to protect background groundwater quality are consistent with Water Quality Goals (CVRWQCB, 1993) and the Tri-Regional Guidelines. The cleanup standards are:

Analytes	SAMU 27 Cleanup Standards (Ig/kg)
Benzo[a]pyrene	1,000
Total PAHs	15,000
Arochlor 1260	1,000
TCE	5
2,4-D	25
MCPA	5,000
2,4,5-T	5
TPH as motor oil	10,000

9.7.7.4 The basis for the sail cleanup standards for benzo(a)pyrene, total PAHs, and Arochlor 1260 is the Risk Based Concentration (RBC) where the cancer endpoint is 1x10 -6 . The cleanup standard for TPH-MO was determined from the Tri-Regional Guidelines. Cleanup standards for other COCs are based on laboratory reporting limits. The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentrations expected in soil water and do not account for an expected decrease in concentrations resulting from migration through less contaminated or clean soils to groundwater (Figures B-20 and B-21). Soil sampling data indicate that the concentrations and numbers of analytes detected generally decrease with increasing sampling depth (none of the COCs was detected at a depth of greater than 10 feet). Significant dilution is therefore anticipated. Because of these factors, it was considered appropriate to use laboratory reporting limits corresponding to the lowest concentrations that can be reproducibly detected as verified by the use of low-level standards (Appendix F) as a basis for all other cleanup standards. This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.7.5 The recommended alternative (Figure 9-11) involves excavating the former waste oil sump, which is presently filled with sand and capped with concrete; excavating soil contaminated with PAHs, PCBs, petroleum hydrocarbons, and herbicides (2,4-D, MCPA, and 2,4,5-T) from beneath the railroad tracks (between SB471 and SB470); and excavating soil contaminated with MCPA (a herbicide) at SB469 (the area of a suspected herbicide spill). Soils will be excavated to 16 feet bgs around the former waste oil sump and to 5 feet bgs in the vicinity of SB469, SB470, and SB471. A total of approximately 130 cy (170 tons) of soil and concrete will be excavated and transported to an off-depot disposal facility. The level of soil contamination at SWMU 27 indicates that the excavated material will be disposed of at a Class I or other disposal facility. Confirmation samples will be collected to ensure that the cleanup standards are attained. Clean soil, imported from off-depot, will be backfilled to replace the excavated material. The former service pit is not recommended for excavation and disposal because contaminated sludge was previously removed from the pit, and the pit was filled with concrete.

9.7.7.6 Groundwater sampling for VOCs, SVOCs, and herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. Compounds with risk-based cleanup standards to protect human health do not threaten groundwater quality and are not included in the monitoring program. As stated in Section 9.1, concentrations of COCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Trichloroethene	2.3
2,4-D	70
MCPA	380*
2,4,5-T	70
TPH motor oil	100

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.7.7 This alternative reduces the toxicity and volume of all COCs in the soil at the site. This alternative is protective of human health and the environment. The threat of COC migration to groundwater will be removed by excavation. The present worth of this alternative is $112,000. The basis for this cost estimate is included in Table 9-15.

9.7.8 Drum Storage Area - Building 30

9.7.8.1 Alternative 3, institutional controls, is the selected remedy for the Drum Storage Area Building 30. The Drum Storage Area Building 30 is located in the southern portion of the depot, near the Consolidated Subsistence Facility. The original area of the site was much larger, but is now partially covered by the Consolidated Subsistence Facility, which was constructed in 1992. During construction of the facility, buried drums were discovered in the vicinity of the Drum Storage Area Building 30. The site now encompasses a relatively small area between a forklift ramp and the central office on the north side of the Consolidated Subsistence Facility. Bis(2-ethylhexyl)phthalate, and di-n-butylphthalate were detected several times in soil samples collected at the site. Benzyl alcohol and diethylphthalate were detected in only one sample. Although phthalates are commonly introduced into environmental samples as part of laboratory analytical procedures, the distribution and magnitude of the concentrations indicate that these detected concentrations may be representative of site conditions.

9.7.8.2 A thorough evaluation of ARARs is provided in Section 10.12.2. Cleanup standards were developed from vadose zone modeling (Montgomery Watson, 1996a) of potential threats to background groundwater quality at this site. Groundwater data were not available for use as a basis for selecting the remedy. The cleanup standards developed to protect background groundwater quality are consistent with Water Quality Goals (CVRWQCB, 1993). The proposed soil cleanup standards are:

Analytes	Building 30 Cleanup Standards (Ig/kg)
Benzyl Alcohol	330
Bis(2-ethylhexyl) phthalate	330
Diethylphthalate	330
di-n-Butylphthalate	330

9.7.8.3 All cleanup standards correspond to the laboratory reporting limit (Radian, 1997). The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentration expected in soil water and do not account for an expected decrease in concentrations resulting from migration through less contaminated or clean soils to groundwater (Figure B-23). Benzyl alcohol and diethylphthalate were only detected in one sample. Because of these factors, it was considered appropriate to use laboratory reporting limits corresponding to the lowest concentrations that can be reproducibly detected as verified by the use of low-level standards (Appendix F) as a basis for all other cleanup standards. This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.7.8.4 The selected remedy includes the installation of one monitoring well downgradient of the site. This well will be monitored for SVOCs to confirm that benzyl alcohol, bis(2-ethylhexyl)phthalate, (diethylphthalate, and di-n-butylphthalate do not pose a threat to background groundwater quality. Four rounds of monitoring for pesticides was agreed upon as a substitute for extending the remedial investigation. The selected remedy will be reevaluated if groundwater concentrations exceed the concentrations of VOCs or SVOCs indicated below or if increasing concentration trends are observed, as discussed in Section 9.1. Four rounds of groundwater sampling for pesticides/herbicides will be performed (see Table 9-2).

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Benzyl Alcoho	l0
Bis(2-ethylhexyl)phthalate	10*
Diethylphthalate	5,600
Di-n-butyl phthalate	700
Trichloroethene	2.3
Tetrachloroethene	2*

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.7.8.5 Five-year site policy reviews are included in the selected remedy. The reviews are required because contaminants will be left in place.

9.7.8.6 This alternative does not actively reduce the toxicity, mobility, or volume of the COCs in the soil. The selected remedy is protective of human health and the environment. The present worth of this alternative is $87,000. The basis for this cost estimate is included in Table 9-16.

9.7.9 Surface and Near-Surface Soil - Northern Depot Area

9.7.9.1 Alternative 3, an asphalt cover, is the selected remedy for the surface and near-surface soils in the Northern Depot Area. Several nonvegetated areas of bare soil are present on the depot. These areas are located at the southern end, the northern end, and near the northwestern corner of the depot. These areas are periodically graded to bare dirt.

9.7.9.2 The results of surface and near-surface soil sampling in the Northern Depot Area indicate that arsenic and manganese are present at levels that pose potential noncarcinogenic risks to grader operators and construction workers. The elevated arsenic and manganese levels are related to ore stockpiles previously located in the Northern Depot Area. The selected remedy consists of installing an asphalt cover over the soils that have elevated levels of arsenic and manganese (approximately 138,000 square feet of soil). The cover will provide a barrier to prevent grader operators or construction workers from coming in contact with surface soils containing elevated levels of arsenic and manganese. The depot requires the use of this area as an active storage area. Therefore, institutional controls were not considered an acceptable remedy for this site.

9.7.9.3 A thorough evaluation of ARARs is provided in Section 10.13.2. Cleanup standards correspond to risk-based concentrations that would reduce the hazard index to 1.0. These standards will be used as a benchmark to reassess the need for continued controls in the first five-year site review. The proposed soil cleanup standards are:

Analytes	Northern Depot Area Cleanup Standards (Ig/kg)
Arsenic	48
Manganese	1,000

9.7.9.4 The asphalt cover will be maintained for as long as soil concentrations exceed the established cleanup standard. The selected remedy will have to be reevaluated before initiating any construction that would impact the asphalt cap.

9.7.9.5 Five-year site reviews are included in the selected remedy. The reviews are required for both statutory and policy reasons. The containment provided by the asphalt cap must be periodically reviewed and wastes will be left in place for more than five years.

9.7.9.6 This alternative does not reduce the toxicity or volume of arsenic or manganese, but it reduces their mobility in the surface and near-surface soils. The selected remedy is protective of human health and the environment because direct contact with soils containing elevated arsenic and manganese levels is significantly reduced by covering the soil with asphalt. The present worth of this alternative is $504,000. The basis for this cost estimate is included in Table 9-17.

9.8 Group C Sites

9.8.1 SWMUs 2 and 3 - Sewage and Industrial Waste Lagoons

9.8.1.1 Alternative 3 (Excavation and Disposal) is the selected remedy for SWMUs 2 and 3. SWMU 2 (Sewage Lagoons) and SWMU 3 (Industrial Lagoons) are located in the northern part of the depot, west of and adjacent to the Sewage Treatment Plant. The industrial lagoons are lined and are no longer in use. The DDJC-Tracy wastewater treatment plant discharges treated water to the sewage lagoons. In January 1996, an EE/CA was prepared to evaluate alternatives and select a non-time-critical removal action for SWMUs 2 and 3 (Radian, 1996a). The recommended removal action is the selected remedy for is SWMUs 2 and 3.

9.8.1.2 A thorough evaluation of ARARs is provided in Section 10.13.2. Cleanup standards were developed from vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards were developed to protect human health and ecological receptors. The cleanup standard to protect background groundwater quality are consistent with Water Quality Goals (CVRWQCB, 1993). The proposed cleanup standards are:

Analytes	SWMUs 2 and 3 Cleanup Standard (Ig/kg)
Selenium	616 b
Lead	28,000 b
Dieldrin	370
DDD	1,600
DDE	1,800
DDT	1,700
Total DDX	241 b
Aldrin	3
Chlordane	10
Diuron	260
Endrin	3
Lindane (Gamma-BHC)	1.7
Monuron	260
2,4-D	47
Heptachlor epoxide	1.5
2,4-Dimethylphenol	330
4-Methylphenol	330
Bis(2-ethylhexyl)phthalate a	330
di-n-butylphthalate a	330

SWMU 2 only.
b Preliminary standard.

9.8.1.3 The cleanup standards for total DDX, lead, and selenium are risk-based standards to protect ecological receptors (see Section 6.6.5). These standards are considered preliminary because they were estimated using literature values rather than site-specific bioaccumulation factors. Additional data will be collected to obtain site-specific bioaccumulation factors, and the cleanup standards and extent of excavation will be revised accordingly through an explanation of significant differences to this ROD.

9.8.1.4 The cleanup standards for DDD, DDE, DDT, dieldrin, and 2,4-D were revised on the basis of DI-WET results obtained during the excavation of SWMUs 2 and 3. These results demonstrated that these pesticides would attenuate in the vadose zone at higher concentrations than were estimated in the RI/FS (Montgomery Watson, 1996a). All other cleanup standards are consistent with laboratory reporting limits. The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentrations expected in soil water and do not account for an expected decrease in concentration resulting from migration through less contaminated or clean soils to groundwater (Figures B-24 through B-27). The numbers and concentrations of analytes in soil generally decreases with increasing depth. Because of these factors, it was considered appropriate to use laboratory reporting limits corresponding to the lowest concentration that can be reproducibly detected as verified by the use of low-level standards (Appendix F) as a basis for all other cleanup standards. This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.8.1.5 The existing industrial waste lagoon liners and partitions are presently being excavated (Figure 9-12). The entire footprint of the lagoons has been excavated to a depth of 1 foot. Pockets of additional pesticide contamination will be excavated until cleanup standards are attained. Confirmation sampling will be performed to ensure that the cleanup standards are met. The total volume of material to be excavated will be approximately 10,000 cy (15,000 tons). The nonhazardous excavated soil will be stockpiled and transported to a Class I or other disposal facility in compliance with state and federal laws and regulations. The initial excavation activities attempted to provide clean closure. The cleanup standards were modified to protect water quality and are expected to achieve clean closure. Clean closure is expected to be verified through groundwater monitoring.

9.8.1.6 Groundwater sampling for SVOCs and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2) to evaluate the effectiveness of the selected remedy. Lead and selenium do not threaten groundwater quality and are not included in the monitoring program. As stated in Section 9.1, concentrations of COCs exceeding the following levels will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Bis(2-ethylhexyl)phthalate	10*
2,4-Dimethylphenol	140
Di-n-butylphthalate	700
4-Methylphenol	10
Aldrin	0.05*
Chlordane	0.1*
DDD	0.15*
DDE	0.1
DDT	0.1
Dieldrin	0.05*
Endrin	2
Lindane (Gamnma-BHC)	0.03
Diuron	14
Monuron	1.0
2,4-D	70
Heptachlor epoxide	0.01*

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.8.1.7 Contaminants will be permanently removed from the site through excavation. The selected remedy is protective of human health at the site under current and future land use conditions. The present worth of this alternative is approximately $2,200,000. The basis of the cost estimate is included in Table 9-18.

9.8.2 SWMU 33 - Industrial Waste Pipeline (IWPL)

9.8.2.1 Alternative 3 (Grouting, Limited Excavation, and Institutional Controls) is the preferred alternative for SWMU 33. In 1972, an existing pipeline and a storm drain line were interconnected to form the IWPL at SWMU 33. The IWPL is constructed of 4-inch to 7-inch diameter pipe of varying composition (transite, vitrified clay, polyvinyl chloride) and is buried to a depth of approximately two to four feet below grade. Eight manholes are located along the pipeline. The pipeline consists of two major segments referred to as the south industrial waste pipeline (SIWPL) and the east industrial waste pipeline (EIWPL). The total length of the SIWPL and its branches is approximately 1,200 lineal feet. The total length of the EIWPL and its branches is also approximately 1,200 lineal feet. Use of the IWPL has been discontinued.

9.8.2.2 A thorough evaluation of ARARs is provided in Section 10.14.2. Cleanup standards were developed from vadose zone modeling (Montgomery Watson, 1996a), which identified potential threats to background groundwater quality at this site. The cleanup standards developed are consistent with Water Quality Goals (CVRWQCB, 1993) and the Tri-Regional Guidelines. The proposed cleanup standards are:

Analytes	SWMU 33 Cleanup Standard (Ig/kg)
Xylenes	5
Diethylphthalate	330
Di-n-butylphthalate	330
Naphthalene	330
Aldrin	1.7
Carbaryl	400
Dieldrin	2
Methiocarb	500
TPH as diesel	100,000

9.8.2.3 The soil cleanup standard for TPHD was developed using the Tri-Regional Guidelines. The equilibrium partitioning limits developed in the RI/FS (see Table 6-9 for summary) provided very conservative estimates of the soil concentrations required to protect background groundwater quality. These limits correspond to the maximum concentration expected in soil water and do not account for an expected decrease in concentration resulting from migration through less contaminated or clean soils to groundwater (Figure B-29). Excavation will be performed at SB461, SB204, and SB462. At other locations the concentrations of COCs in soil decrease with increasing depth. Because of these factors, it was considered appropriate to use a laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard (Appendix F) as a basis for all other cleanup standards. This analysis modifies the cleanup standards presented in the RI/FS (Montgomery Watson, 1996a).

9.8.2.4 An engineering evaluation/cost analysis (EE/CA)(Radian, 1996) has been prepared to expedite the action for SWMU 33 (Radian, 1996). According to the EE/CA, the recommended removal action alternative for SWM 33 involves pressure grouting the laterals and sumps in the IWPL and excavating the most contaminated soils (approximately 10 cy). It should be noted that the sumps at manholes W-1 and W-3 are interpreted as being part of SWMUs 20. As discussed in Section 9.5.5, excavation and disposal are recommended for the sumps and surrounding soils at manholes W-1 and W-3. In addition, SVE is recommended for VOC contamination at SB108 (Area 1 Building 10) and SB431 (SWMUs 20/23).

9.8.2.5 These excavations will not address all areas of the IWPL where contaminants are present above cleanup standards. Aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate will be present above the cleanup standards and pose a potential threat to background groundwater quality. However, the contaminants are generally below buildings or other paved areas, so the threat of migration to groundwater is considered low. Therefore, the selected remedy supplements the grouting and excavation with groundwater monitoring and institutional controls. Groundwater sampling for VOCs, SVOCs, and pesticides/herbicides will be performed as part of the Well Monitoring Program (see Table 9-2). As stated in Section 9.1, concentrations of COCs exceeding the following concentrations will be evaluated in the Annual Well Monitoring Reports.

Analytes	Groundwater Concentrations Requiring Evaluation (Ig/L)
Xylenes	17
Diethylphthalate	5,600
Di-n-butylphthalate	700
Naphthalene	20
TPH as diesel	100
Aldrin	0.05*
Carbaryl	60
Dieldrin	0.05*
Methiocarb	5

* For these compounds, results above the estimated detection limit (see Table 9-7) will be reported as trace amounts and will be evaluated. Cases where the actual detection limit differs significantly from the estimated detection limit because of matrix or other effects will be flagged.

9.8.2.6 The selected remedy also includes land use restrictions around the IWPL. Buildings and pavement greatly reduce the effects of percolation along the pipeline. Any construction, excavation, or demolition along the IWPL will require an evaluation of potential impacts to the selected remedy. This evaluation will be provided to the signatory parties of the ROD for approval before construction activities. Land use restrictions are currently documented at DDJC-Tracy in a Master Plan. In this Master Plan, SWMU 33 is presently designated for industrial use only. This restriction is required as part of the selected remedy. If ownership of the installation is transferred to private or non-federal entities in the future, restrictive covenants will be written into the land property deed to prevent schools, playgrounds, hospitals, and housing from being built at the site until COCs are below levels of concern. Cooperation among the U.S. Army, San Joaquin County, and Cal-EPA will be required to enact the access and land use restrictions.

9.8.2.7 Five-year site reviews are included in the selected remedy as specified in the CERCLA guidance. Statutory and policy reviews are required because wastes will be left in place and the use of the site will be limited by institutional controls. Site reviews may include literature searches, site walks, interviews, and minimal sampling. Groundwater sampling at these sites will be conducted as part of the Well Monitoring Program.

9.8.2.8 Some of the contaminants will be permanently removed from the site through excavation. The grouting of the pipe will further reduce the mobility of the contaminants by preventing water from entering or leaking from cracks in the IWPL. The selected remedy is protective of human health and the environment. The present worth of this alternative is $242,600. The basis of this cost estimate is included in Table 9-19.

9.9 Five-Year Review Process

9.9.1 Every five years, the success of the selected remedies will be evaluated using the most current knowledge and site information. The five-year reviews provide an opportunity to reexamine past decisions. Statutory reviews are required for sites that will not allow for unlimited use and unrestricted exposure on attainment of ROD cleanup levels. Policy reviews are required for sites that require more than five years to attain ROD cleanup levels. Policy reviews must be completed within five years of the initiation of the remedial action. The five-year reviews will evaluate the performance of the selected remedy and be continued for as long as cleanup standards are exceeded or soil contaminants remain in place. DDJC-Tracy will document the review as a secondary document. As specified in the FFA, any party to the agreement may submit a written proposal for additional work or modification of the selected remedy.

9.9.2 The results of the DDJC-Tracy Well Monitoring Program will provide key information for evaluating the sites in the review process. Groundwater monitoring will be conducted in accordance with Title 27 of the California Code of Regulations. Specifically, Section 20430 requires monitoring to determine the effectiveness of corrective actions.

Sections 20410, 20950, 22207(a), 22212(a), and 22222 identify monitoring requirements for the closure, post-closure, and compliance periods. Pursuant to Title 27, Section 20410(c), monitoring is required for three consecutive years following the date that ROD cleanup standards are achieved. Pursuant to Title 27, Section 20950(a), the post-closure maintenance period lasts as long as water quality is threatened by the COCs.

9.10 Post-ROD Documents

9.10.1 DDJC-Tracy will submit a schedule for all post-ROD primary documents within 30 calendar days of the issuance of the Site-Wide Comprehensive Record of Decision. The following post-ROD documents will be submitted as primary documents:

- Remedial Design Work Plan (to include sampling and analysis plan);
- Remedial Design (to include institutional controls);
- Remedial Action Work Plan (to include sampling and analysis plan);
- Construction Quality Assurance Plan;
- Construction Quality Control Plan;
- Construction Completion Report; and
- Project Closure Plan.

9.10.2 Separate design packages are planned for the SVE sites (Group A sites and SWMU 20) and the remaining soil sites. For each of these sites, the Construction Quality Assurance and Construction Quality Control Plans will be combined into a single document. All documents except for the Project Closure Plan will be modified primary documents that have a 30-day review period.

9.10.3 Technical and economic evaluations of the SVE sites will be prepared before treatment is discontinued. These evaluations will be primary documents.

Table 9-1. Selected Remedies

SWMU Number/Site	Description	Comments
OU1 Groundwater	Extraction, Treatment (Air Stripping, Carbon), Injection	
SWMU 1/Area 2	Soil Vapor Extraction	
SWMUs 2/3	Excavation with Off-Site Disposal	
SWMU 4	Excavation and Off-Site Disposal of Sediments	
SWMU 5	No, Further Action	No contamination identified at this site.
SWMU 6	Excavation with Off-Site Disposal	
SWMU 7	Institutional Controls (modify property records of Buildings 19 and 21, two additional monitoring wells, and groundwater monitoring)	
SWMU 8	Excavation with Off-Site Disposal	
SWMU 9	No Further Action	No contamination identified at this site.
SWMU 10	No Further Action	No contamination identified at this site.
SWMU 10A	No Further Action	No adverse human health risk. Remediation to address potential threat to groundwater would require $2 million to $4 million.
SWMU 11	No Further Action	No contamination identified at this site.
SWMU 12	No Further Action	No contamination identified at this site.
SWMU 14	No Further Action	No threat to groundwater and no adverse human health risk from chemicals of potential concern in soils.

Table 9-1. (Continued)

SWMU Number/Site	Description	Comments
SWMU 15	No Further Action	No contamination identified at this site.
SWMU 16	No Further Action	No contamination identified at this site.
SWMU 20	Soil Vapor Extraction, Limited Excavation with Off-Site Disposal, and Natural Attenuation	
SWMU 21	No Further Action	No contamination identified at this site.
SWMU 22	No Further Action	No contamination identified at this site.
SWMU 23	No Further Action	No threat to groundwater and no adverse human health risk from chemicals of potential concern in soils.
SWMU 24	Bioventing	
SWMU 25	No Further Action	No contamination identified at this site.
SWMU 27/Area 1	Excavation with Off-Site Disposal	
SWMU 29	No Further Action	No contamination identified at this site.
SWMU 30	No Further Action	No contamination identified at this site.
SWMU 31	No Further Action	No contamination identified at this site.
SWMU 33	Pipe Grouting, Limited Excavation, and Institutional Controls (land use restrictions along IWPL and groundwater monitoring)	
SWMU 64	No Further Action	No contamination identified at this site.
Area 1 Building 236	No Further Action	No contamination identified at this site.

Table 9-1. (Continued)

SWMU Number/Site	Description	Comments
Area 1 Building 237	Soil Vapor Extraction	
Area 3	Soil Vapor Extraction	
Building 15 Drum Storage Area	No Further Action	No contamination identified at this site.
Building 22 Drum Storage Area	No Further Action	No contamination identified at this site.
Building 23	No Further Action	No contamination identified at this site.
Building 30 Drum Storage Area	Institutional Controls (groundwater monitoring)	
Depot Wide Surface and Near-Surface Soils, Northern Depot Area	Asphalt Cover	
Day Care Center	Excavation and Disposal (Corrective Action Completed)	

SWMU = Solid Waste Management Unit

Table 9-2. Performance Monitoring Network

Well ID	Rationale
Existing Monitoring Wells-OU 1	
LM025AUA	Monitor VOC cleanup performance of extraction well EW-37AU
LM055B	Monitor VOC cleanup performance of extraction well EW-27B
LM056C	Monitor VOC cleanup performance of extraction well EW-31C
LM058AU	Monitor VOC cleanup performance of extraction well EW-34AU
LM063A	Monitor groundwater quality in the Upper Horizon north of the northern infiltration galleries and confirm that the Upper Horizon VOC plum has not migrated downgradient of the OU 1 Remedial Design in this vicinity
LM064B	Monitor groundwater quality in the Middle Horizon north of the northern infiltration galleries and confirm that the Middle Horizon VOC plum has not migrated downgradient of the OU 1 Remedial Design in this vicinity
LM065C	Monitor groundwater quality in the Lower Horizon north of the northern infiltration galleries and confirm that the Lower Horizon VOC plum has not migrated downgradient of the OU 1 Remedial Design in this vicinity
LM066A	Monitor VOC cleanup performance of extraction well EW-21A
LM067B	Monitor VOC cleanup performance of extraction well EW-26B
LM070C	Monitor VOC cleanup performance of extraction well EW-13C
LM076A	Monitor VOC cleanup performance in the Upper Horizon directly south of the Banta Road, Extraction Wellfield (OU 1 Remedial Design)
LM077A	Monitor VOC concentrations directly east of the northern galleries
LM081C	Monitor VOC cleanup performance of extraction well EW-30C
LM083A	Monitor groundwater quality in the Upper Horizon northwest of the northern infiltration galleries and confirm that the Upper Horizon VOC plum has not migrated downgradient. of the OU 1 Remedial Design in this vicinity
LM084B	Monitor groundwater quality in the Middle Horizon northwest of the northern infiltration galleries and confirm that the Middle Horizon VOC plum has not migrated downgradient of the OU 1 Remedial Design in this vicinity

Table 9-2. (Continue)

Well ID	Rationale
LM089C	Monitor groundwater quality in Lower Horizon cross-gradient of extraction well (EW-31C).
LM093AU	Monitor VOC cleanup performance of extraction well EW-36AU
LM143AU	Monitor VOC cleanup performance of extraction well EW-22
LM145AU	Evaluate if off-site chloroform plume is migrating toward DDJC-Tracy as a result of the reinjection of treated groundwater into the Upper Horizon from the southern infiltration galleries.
LM146A	Monitor VOC cleanup performance of extraction well EW-15A
LM148C	Monitor groundwater quality downgradient of extraction wells EW-13C, EW-31C, and EW-30C.
LM053A	Monitor for dieldrin to evaluate the effectiveness of the extraction system
LM028A	Monitor for dieldrin to evaluate the effectiveness of the extraction system
LM1O1A	Monitor for dieldrin to evaluate the effectiveness of the extraction system
LM094AU	Monitor for dieldrin to evaluate the effectiveness of the extraction system
Proposed New Monitoring Wells-OU 1	
PMW001A\LM150A	Monitor the VOC and off-site chloroform plumes located south and southeast of the proposed Banta Road Extraction Wellfield (OU 1 Remedial Design), respectively.
PMW002A\LM151A	Monitor the VOC and off-site chloroform plumes located south and southeast of the proposed Banta Road Extraction Wellfield (OU 1 Remedial Design), respectively.
PMW003A\LM152A	Monitor the off-site chloroform plume located southeast of the proposed Banta Road Extraction Wellfield (OU 1 Remedial Design).
PMW004A\LM153A	Monitor VOC cleanup performance of extraction wells EW-19A and EW-20A
PMW005B\LMl54A	Monitor VOC cleanup performance of extraction wells EW-24B and EW-25B
PMW006A\LM155A	Monitor cleanup of the VOC plume east of the Banta Road Extraction Wellfield (OU 1 Remedial Design)
PMW007A\LM156A	Monitor cleanup and dispersion of the VOC plume and movement of the chloroform plume east of the Banta Road Extraction Wellfield (OU 1 Remedial Design)

Table 9-2. (Continue)

Well ID	Rationale
PMW008A\LM157A	Monitor cleanup and dispersion of the VOC plume and movement of the chloroform plume east and northeast of the Banta Road Extraction Wellfield (OU 1 Remedial Design)
PMW009A\LM158A	Monitor cleanup and dispersion of the VOC plume and movement of the chloroform plume northeast of the Banta Road Extraction Wellfield (OU 1 Remedial Design)
PMW010A\LM159A	Monitor cleanup and dispersion of the VOC plume northeast of the Banta Road Extraction Wellfield (OU 1 Remedial Design)
PMW011A\LM160A	Monitor cleanup and dispersion of the VOC plume northeast of the Banta Road Extraction Wellfield (OU 1 Remedial Design)
PMW012A\LM161A	Monitor cleanup and dispersion of the VOC plume northeast of the Banta Road Extraction Wellfield (OU 1 Remedial Design)
PMW013A\LM162A	Monitor VOC concentrations north of the OU 1 Remedial Design Extraction Wellfield constructed near former Agricultural Well #2
PMW014B\LM163A	Monitor potential migration of off-site chloroform plume east of Banta Road Extraction well field
PMW015B\LM164A	Monitor potential migration of off-site chloroform plume southeast of Banta Road Extraction well field
PMW016A\LM165A	Monitor potential migration of off-site chloroform plume northeast of Banta Road Extraction well Field
Existing Monitoring Wells-SWMU 1/Area 2	
LM030AUA	Monitor TCE and PCE migrating from source area to EW008A
LM040B	Closest Middle Horizon well to VOC source area. Monitor for VOCs.
LM041B	Monitor for VOCs to evaluate effectiveness of SVE system in preventing groundwater contamination
LM094AU	Monitor VOCs from SWMU1/Area 2 to evaluate the performance of the SVE system.
Existing Monitoring Well Area 3	
LM032AU	Monitor for VOCs to assess effectiveness of SVE system in preventing groundwater impacts

Table 9-2. (Continue)

Well ID	Rationale
Existing Monitoring Wells-Area 1 Building 237	
LM137A	Monitor for VOCs to assess effectiveness of SVE system in preventing groundwater
LM061AU	Monitor for VOCs to assess effectiveness of SVE system in preventing groundwater impacts
Existing Monitoring Wells-SWMUs 2/3	
LM003AA	Monitor performance of removal action at SWMUs 2/3. Closest downgradient well. Monitor for SVOCs, OC and C/U pesticides.
LM015AA	Monitor performance of removal action at SWMUs 2/3. Closest downgradient well. Monitor for SVOCs, OC and C/U pesticides.
Existing Monitoring Wells-SWMU 4	
LM004AU	Monitor for SVOCs, VOCs, OC and C/U pesticides, and simazine to assess potential groundwater impacts at SWMU 4
LM027AUA	Monitor for SVOCs, VOCs, OC and C/U pesticides, and simazine to potential groundwater impacts at SWMU 4 nearest downgradient well
Existing Monitoring Wells-SWMU6	
LM017A	Monitor for VOCs, OC and C/U pesticides, and chlorinated herbicides to evaluate the performance of the excavation at SWMU 6
LM092C	Upgradient from potential source at SWMU 6. Monitor for VOCs.
Existing Monitoring Wells-SWMU 7	
LM095AU	Downgradient from south area pits. Monitor for VOCs, OP, OC, and C/U pesticides, chlorinated herbicides, SVOCs, and dioxins/furans.
New Monitoring Wells-SWMU 7	
LM166AU	Monitor for VOCs, TPHD, OP, OC, and C/U pesticides, chlorinated herbicides, and SVOCs to evaluate potential groundwater impacts from contaminants left in place.
LM167AU	Monitor for VOCs, TPHD, dioxins/furans, SVOCs, OP, OC, and C/U pesticides dioxins/furans, and chlorinated herbicides. Nearest downgradient well from Pits D and F.
Existing Monitoring Wells-SWMU 8	
LM019A	Monitor for VOCs, SVOCs, OC and C/U pesticides, and simazine to evaluate the performance of the remedial action.

Table 9-2. (Continue)

Well ID	Rationale
LM097AU	Nearest well to potential source of OC pesticides, simazine, VOCs, and dioxin/furan compounds.
LM119A	Monitor for VOCs, SVOCs, chlorinated herbicides, and OC pesticides, nearest downgradient well to potential source area.
New Monitoring Wells-SWMU 8	
LM168A	Nearest downgradient well from potential source at SWMU 8. Monitor for VOCs, SVOCs, chlorinated herbicides, dioxins/furans, and OC pesticides.
Existing Monitoring Wells-SWMU 10A	
LM014A	Monitor for SVOCs to ensure No Further Action determination for SWMU 10A was appropriate.
Existing Monitoring Wells-SWMU 20	
LM085B	Monitor vertical migration downgradient from SWMUs 20/23 and Area 1/Building 10. Monitor for VOCs, SVOCs, OC and C/U pesticides, chlorinated herbicides, and TPHD.
LM093AU	Monitor VOCs, SVOCs, OC, OP, and C/U pesticides from SWMUs 20/23 to evaluate the performance of the remedial action.
LM115AU	Monitor VOCs, SVOCs, OC, OP, and C/U pesticides, and chlorinated herbicides to evaluate migration from source area.
Existing Monitoring Wells--SWMU 24	
LM116A	Monitor for VOCs, SVOCs, PCBs, TPHG, TPHD, OC, and C/U pesticides to evaluate migration from source area.
LM118AU	Nearest downgradient well to potential source of TPH, VOCs, SVOCs, OC and C/U pesticides, and PCBs at SWMU 24.
Existing Monitoring Wells--SWMU 27	
LM117A	Monitor migration of VOCs, herbicides, and TPH-MO from potential source at SWMU 27.
Existing Monitoring Wells--SWMU 33	
LM002A	Monitor for VOCs, SVOCs, OC and C/U pesticides associated with SWMU 33. Monitoring will assess effectiveness of removal action and identify impacts from contaminants left in place.
LM129A	Monitor source area for VOCs, SVOCs, TPH, and chlorinated herbicides.
Existing Monitoring Wells-Drum Storage Area 30-1	
LM169A	Nearest downgradient well. Monitor for VOCs, SVOCs, and pesticides/herbicides.

Table 9-2. (Continue)

C/U	=	carbamate/urea
OC	=	organochlorine
OP	=	organophosphorus
OU	=	Operable Unit
SVE	=	soil vapor extraction
SVOC	=	semivolatile organic compound
TPHD	=	total petroleum hydrocarbons as diesel
TPHG	=	total petroleum hydrocarbons as gasoline
TPH-MO	=	total petroleum hydrocarbons as motor oil
VOC	=	volatile organic compound

Table 9-3. OU 1 Groundwater
Alternative 3 - Groundwater Extraction and Treatment

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS (Dieldrin)				
EQUIPMENT COSTS (EC)				
Conveyance Piping and Fittings	2,000	Linear foot	$5	$10,000
Wellhead Equipment (Pumps & Controls)	1	Lump sum	$10,000	$10,000
Granular Activated Carbon (GAC) Units	18	each	$3,500	$63,000
			Subtotal EC	$83,000
CONSTRUCTION COSTS				
Extraction and Injection Wells a	11	each	$10,000	$110,000
Equipment Pads	9	each	$2,500	$22,500
Permitting	1	lump sum	$10,000	$10,000
Pumping Test	1	lump sum	$15,000	$15,000
Trenching	2,000	linear foot	$13	$26,000
System Startup	1	lump sum	$15,000	$15,000
Mechanical		40% of EC		$33,200
Instrumentation		10% of EC		$8,300
Electrical		20% of EC		$16,600
			Subtotal	$256,600
TOTAL DIRECT CAPITAL COST (DCC)				$339,600
INDIRECT CAPITAL COSTS (Dieldrin)				
Engineering Design Services		6% of DCC		$20,400
Office Engineering During Construction		4% of DCC		$13,600
Non-Design Engineering		2% of DCC		$6,800
Construction Management		10% of DCC		$34,000
Contingency		30% of DCC		$101,900
Contract Administration		17% of DCC		$57,800
Contractor's Overhead and Profit		20% of DCC		$68,000
TOTAL INDIRECT CAPITAL COST				$302,500

Table 9-3. (Continued)

TOTAL CAPITAL REQUIREMENT				$642,100
ANNUAL OPERATION AND MAINTENANCE COSTS (Dieldrin)				
Influent/Effluent Monitoring b	216	each	$200	$43,200
Spent GAC Changeout Costs c	27	each	$1,900	$51,300
Labor	0.25	man-year	$75,000	$18,750
Maintenance Materials	1	lump sum	$2,000	$2,000
Groundwater Monitoring d	1	lump sum	$10,000	$10,000
Injection Well Redevelopment e	1	lump sum	$16,800	$16,800
TOTAL O&M COSTS				$142,050
PRESENT WORTH (Dieldrin)				
Interest Rate			7%	
Years			30	
DIELDRIN UPGRADE PRESENT WORTH				$2,528,000
CAPITAL COSTS (VOCs)				$3,324,400
TOTAL PRESENT WORTH				$12,037,500

a Based on nine extraction wells and two injection wells

b Based on one influent sample and one effluent sample collected monthly and analyzed for dieldrin.

c Based on three changeouts per year for each well. Includes disposal of spent GAC and replacement with fresh GAC.

d Based on monitoring 10 wells for dieldrin.

e The two injection wells will be re-developed every two months to prevent fouling.

Table 9-4. SWMU 1/Area 2 - Aboveground Solvent Tank/Building 26 Recoup Operations
Alternative 3 - Soil Vapor Extraction

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL VAPOR EXTRACTION				
Mobilization/Demobilization a	1	lump sum	$1,000	$1,000
Air Extraction Vents	1	lump sum	$47,000	$47,000
Collection Piping	2,000	linear foot	$20	$40,000
Rental of Mobile Blower System b	12	months	$2,000	$24,000
Labor (O&M)	0.25	man-year	$75,000	$18,750
Air Effluent Testing	1	lump sum	$5,000	$5,000
Confirmation Sampling (Soil Gas)	1	lump sum	$2,000	$2,000
CLOSURE REPORT c	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$140,550
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$8,500
Office Engineering During Construction		4% of DCC		$5,700
Non-Design Engineering		2% of DCC		$2,900
Construction Management		10% of DCC		$14,100
Contingency		30% of DCC		$42,200
Contract Administration		17% of DCC		$23,900
Contractor's Overhead and Profit		20% of DCC		$28,200
TOTAL INDIRECT CAPITAL COST				$125,500
TOTAL CAPITAL REQUIREMENT				$266,100
PRESENT WORTH				
		Interest Rate	7%	
		Years	1	
		TOTAL PRESENT WORTH		$266,600

Assumptions:
a Mobilization/demobilization of SVE system will be conducted concurrently with same for systems at other sites.
b Includes vapor-phase carbon treatment; assumes that two systems will be needed, each operated for 6 months.
c 25-page report to be included in depot-wide closure report.

Table 9-5. Area 1 Building 237
Alternative 3 - Soil Vapor Extraction

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL VAPOR EXTRACTION				
Mobilization/Demobilization a	1	lump sum	$1,000	$1,000
Air Extraction Vents	1	lump sum	$22,000	$22,000
Collection Piping	500	linear foot	$20	$10,000
Rental of Mobile Blower System b	6	months	$2,000	$12,000
Labor (O&M)	0.25	man-year	$75,000	$18,750
Air Effluent Testing	1	lump sum	$5,000	$5,000
Confirmation Sampling (Soil Gas)	1	lump sum	$2,000	$2,000
CLOSURE REPORT c	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$73,550
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$4,500
Office Engineering During Construction		4% of DCC		$3,000
Non-Design Engineering		2% of DCC		$1,500
Construction Management		10% of DCC		$7,400
Contingency		30% of DCC		$22,100
Contract Administration		17% of DCC		$12,600
Contractor's Overhead and Profit		20% of DCC		$14,800
TOTAL INDIRECT CAPITAL COST				$65,900
TOTAL CAPITAL REQUIREMENT				$139,500
PRESENT WORTH				
		Interest Rate	7%	
		Years	1	
TOTAL PRESENT WORTH				$140,000

Assumptions:
a Mobilization/demobilization of SVE system will be conducted concurrently with same for systems at other sites.
b Includes vapor-phase carbon treatment.
c 25-page report to be included in depot-wide closure report.

Table 9-6. Area 3
Alternative 3 - Soil Vapor Extraction

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL VAPOR EXTRACTION				
Mobilization/Demobilization a	1	lump sum	$1,000	$1,000
Air Extraction Vents	1	lump sum	$46,000	$46,000
Collection Piping	2000	linear foot	$20	$40,000
Rental of Mobile Blower System b	6	months	$2,000	$12,000
Labor (O&M)	0.25	man-year	$75,000	$18,750
Air Effluent Testing	1	lump sum	$5,000	$5,000
Confirmation Sampling (Soil Gas)	1	lump sum	$2,000	$2,000
CLOSURE REPORT c	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$127,550
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$7,700
Office Engineering During Construction		4% of DCC		$5,200
Non-Design Engineering		2% of DCC		$2,600
Construction Management		10% of DCC		$12,800
Contingency		30% of DCC		$38,300
Contract Administration		17% of DCC		$21,700
Contractor's Overhead and Profit		20% of DCC		$25,600
TOTAL INDIRECT CAPITAL COST				$113,900
TOTAL CAPITAL REQUIREMENT				$241,500
PRESENT WORTH				
		Interest Rate	7%	
		Years	1	
		TOTAL PRESENT WORTH		$242,000

Assumptions:
a Mobilization/demobilization of SVE system will be conducted concurrently with same for systems at other sites.
b Includes vapor-phase carbon treatment.
c 25-page report to be included in depot-wide closure report.

Table 9-7. Groundwater Monitoring Requirements (Ig/L) for DDJC-Tracy

Analyte	Method	Beneficial Use Limit	Background Concentration	Quantitation Limit	Estimated Detection Limit a	Groundwater Concentration Requiring Evaluation	Rationale
Soil Cleanup Standards (Ig/kg)							
Acetone	SW8260B	700	NE	10	-	700	Corresponds to beneficial use limit.
Aldrin	SW8081A	0.002	0.005 b	0.05	0.01	0.05(0.01)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Benzyl alcohol	SW8270C	NA	NE	10	-	10	Corresponds to quantitation limit.
bis(2-Ethylhcxyl)phthalate	SW8270C	4.2	NE	10	2	10(2)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
2-Butanone	SW8260B	4,200	NE	20	-	4,200	Corresponds to beneficial use limit.
Carbaryl	E632	60	0.382 b	5	-	60	Corresponds to beneficial use limit.
Carbofuran	E632	18	NE	5	-	18	Corresponds to beneficial use limit.
Chlordane	SW8081A	0.03	0.104 b	0.1	(0.05)	0.1(0.05)	Quantitative results will be provided at the concentration listed Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
2,4-D	SW8151A	70	0.101 b	10	-	70	Corresponds to beneficial use limit.
DDD	SW8081A	0.15	0.005 b	0.1	-	0.15	Corresponds to beneficial use limit.
DDE	SW8081A	0.1	0.005 b	0.1	-	0.1	Corresponds to beneficial use limit.
DDT	SW8081A	0.1	0.005 b	0.1	-	0.1	Corresponds to beneficial use limit.
Dicamba	SW8151A	210	0.091 b	10	-	210	Corresponds to beneficial use limit.
1,2-Dichloroethene	SW8260B	6	NE	0.5	-	6	Corresponds to beneficial use limit.

Table 9-7. (Continued)

Analyte	Method	Beneficial Use Limit	Background Concentration	Quantitation Limit	Estimated Detection Limit a	Groundwater Concentration Requiring Evaluation	Rationale
Soil Cleanup Standards (Ig/kg)(Continued)							
Dieldrin	SW8081A	0.002	0.005 b	0.05	0.01	0.05(0.01)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Diethylphthalate	SW8270C	5,600	NE	10	-	5,600	Corresponds to beneficial use limit.
2,4-Dimethylphenol	SW8270C	140	NE	10	-	140	Corresponds to beneficial use limit.
Di-n-butyl phthalate	SW8270C	700	NE	10	-	700	Corresponds to beneficial use limit.
2,4-Dinitrophenol	SW8270C	14	NE	50	10	50(10)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
2,4-Dinitrotoluene	SW8270C	0.11	NE	10	2	10(2)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Dioxins/Furans	SW8280	0.0000002 7	0.000001	0.01	0.01	0.01(0.01)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated9 detection limits (in parenthesis).
Diuron	E632	14	0.144 b	1	-	14	Corresponds to beneficial use limit.
Endrin	SW8081A	2	0.005 b	0.1	-	2	Corresponds to beneficial use limit.
Ethylbenzene	SW8260B	29	NE	2.0	-	29	Corresponds to beneficial use limit.
Fluoranthene	SW8270C	280	NE	10	-	280	Corresponds to beneficial use limit.

Table 9-7. (Continued)

Analyte	Method	Beneficial Use Limit	Background Concentration	Quantitation Limit	Estimated Detection Limit a	Groundwater Concentration Requiring Evaluation	Rationale
Soil Cleanup Standards (Ig/kg) (Continued)							
Heptachlor	SW8081A	0.006	0.005 b	0.01	0.01	0.01(0.01)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Heptachlor Epoxide	SW8081A	0.003	0.005 b	0.01	0.01	0.01(0.01)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
2-Hexanone	SW8260B	NA	NE	10	-	10	Corresponds to quantitation limit.
Lindane	SW8081A	0.03	0.005 b	0.03	-	0.03	Corresponds to beneficial use limit.
Linuron	E632	1.4	0.157 b	2	1.0	2(1.0)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
MCPA	SW8151	3.5	NE	380	100	380(100)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Methiocarb	E632	NA	1.36 b	5	-	5	Corresponds to quantitation limit.
4-Methyl-2-pentanone	SW8260B	40	NE	10	-	40	Corresponds to beneficial use limit.
2-Methylnaphthalene	SW8270C	NA	NE	10	-	10	Corresponds to quantitation limit.
4-Methylphenol	SW8270C	NA	NE	10	-	10	Corresponds to quantitation limit.
Monuron	E632	NA	0.163 b	1	-	1.0	Corresponds to quantitation limit.
Naphthalene	SW8270C	20	NE	10	-	20	Corresponds to beneficial use limit.
PCB (Aroclor 1260)	SW8082	NA	NE	0.5	-	0.5	Corresponds to quantitation limit.

Table 9-7. (Continued)

Analyte	Method	Beneficial Use Limit	Background Concentration	Quantitation Limit	Estimated Detection Limit a	Groundwater Concentration Requiring Evaluation	Rationale
Soil Cleanup Standards (Ig/kg) (Continued)							
Pentachlorophenol	SW8270C	1.9	NE	50	10	50(10)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Phenanthrene	SW8270C	NA	NE	10	-	10	Corresponds to quantitation limit.
Phenol	SW8270C	4,200	NE	10	-	4,200	Corresponds to beneficial use limit.
Phorate	SW8141A	NA	NE	0.5	-	0.5	Corresponds to quantitation limit.
Pyrene	SW8270C	210	NE	10	-	210	Corresponds to beneficial use limit.
Ronnel	SW8141A	NA	NE	0.5	-	0.5	Corresponds to quantitation limit.
Simazine	E507	4	0.492 b	0.2	-	4	Corresponds to beneficial use limit.
2,4,5-T	SW8151A	70	NE	10	-	70	Corresponds to beneficial use limit.
Tetrachloroethene	SW8260C	0.7	NE	2	0.5	2(0.5)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Toluene	SW8260C	42	NE	1	-	42	Corresponds to beneficial use limit.
TPH-Diesel	SW8015Mod	100	NE	100	-	100	Corresponds to beneficial use limit.
TPH-Gasoline	SW8015Mod	5	NE	50	40	50(40)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
TPH-Motor Oil	SW8015Mod	100	NE	100	-	100	Corresponds to beneficial use limit.
Trichloroethene	SW8260B	2.3	NE	1	-	2.3	Corresponds to beneficial use limit.

Table 9-7. (Continued)

Analyte	Method	Beneficial Use Limit	Background Concentration	Quantitation Limit	Estimated Detection Limit a	Groundwater Concentration Requiring Evaluation	Rationale
Soil Cleanup Standards (Ig/kg) (Continued)							
2,4,6-Trichlorophenol	SW8270C	0.5	NE	10	2	10(2)	Quantitative results will be provided at the concentration listed. Trace concentrations will be reported down to the estimated detection limits (in parenthesis).
Xylenes	SW8260B	17	NE	2	-	17	Corresponds to beneficial use limit.

a Estimated method detection limits (MDLs) which should be achievable for project laboratories by performing the MDL study following 40 CFR 136, Appendix B issued July 1, 1997. The reported MDLs will be laboratory specific and shall be at or below estimated detection limit. Groundwater monitoring results will include reporting of all concentrations between the laboratory MDL and quantitation limit as trace or "DNQ." In cases where a change in matrix or other effects caused the MDL or quantitation limit to differ significantly from the laboratory-derived MDL/RL values, the results shall be flagged accordingly, along with the estimates of the detection limit and quantitation limit actually received.

b These compounds have not been detected in background wells. The value cited is the lowest detection limit used to analyze groundwater during the remedial investigation.

() = estimated detection limit
NA = not available
NE = not evaluated
Ig/kg = micrograms per kilogram
Ig/L = micrograms per Liter

Table 9-8 SWMU 4 - Storm Drain Lagoon
Alternative 3 - Excavation and Disposal of Sediments

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SEDIMENT EXCAVATION/DEWATERING				
Engineering Oversight a	60	hour	$130	$7,800
Mobilization & Demobilization	1	lump sum	$10,000	$10,000
Site Preparation	1	lump sum	$1,000	$1,000
Excavation b	3,010	ton	$30	$90,300
Sediment Dewatering	3,010	cubic yards	$5	$15,000
Clean Backfill	560	cubic yards	$10	$5,600
Site Restoration	1	unit	$59,400	$59,400
Sediment Trap or Cyclones	1	unit	$150,000	$150,000
POST-EXCAVATION SAMPLING				
Sampling				
Personnel	40	hour	$60	$2,400
Sampling Material	1	lump sum	$500	$1,000
Analyses c	31	sample	$500	$15,500
Surface Water Analyses	10	sample	$125	$1,250
CLASS III DISPOSAL FACILITY d				
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$300	$300
Disposal e	3,010	ton	$30	$90,300
CLOSURE REPORT f	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$452,650
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$27,160
Office Engineering During Construction		4% of DCC		$18,110
Non-Design Engineering		2% of DCC		$9,050
Construction Management		10% of DCC		$45,270
Contingency		30% of DCC		$135,800
Contract Administration		17% of DCC		$76,950
Contractor's Overhead and Profit		20% of DCC		$90,530
TOTAL INDIRECT CAPITAL COST				$402,870
TOTAL CAPITAL REQUIREMENT				$855,520

PRESENT WORTH

Interest Rate	7%	
Years	1	
TOTAL PRESENT WORTH		$855,520

Assumptions:

a Two-person crew (one senior and one professional), 6 days, 10-hour days

b Sediment volume to be excavated is approximately 2,315 cubic yards (3,010 tons). Assumed moisture content of sediment is 50%.

c Assumes 1 sample collected per 100 cubic yards.

d Disposal of dewatered sediment at nearby municipal (Subtitle D) landfill.

e Cost includes transportation and 10% county tax.

f 25-page report to be included in depot-wide closure report.

Table 9-9. SWMU 6 - Building 28 Sump
Alternative 4a- Excavation and Class II Disposal

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL EXCAVATION				
Engineering Oversight a	20	hour	$130	$2,600
Mobilization & Demobilization	1	lump sum	$15,000	$1,500
Site Preparation	1	lump sum	$500	$500
Temporary Fence	100	linear foot	$3	$300
Excavation b	130	ton	$30	$3,900
Imported Fill	78	ton	$6	$468
Backfilling and Compaction	130	ton	$30	$3,900
POST-EXCAVATION SAMPLING				
Sampling				
Personnel	12	hour	$60	$720
Sampling Material	1	lump sum	$500	$500
Analyses c	5	sample	$200	$1,000
CLASS II DISPOSAL FACILITY d				
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$300	$300
Disposal e	78	ton	$60	$4,680
CLOSURE REPORT f	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$23,168
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$4,400
Office Engineering During Construction		4% of DCC		$1,000
Non-Design Engineering		2% of DCC		$500
Construction Management		10% of DCC		$2,400
Contingency		30% of DCC		$7,000
Contract Administration		17% of DCC		$4,000
Contractor's Overhead and Profit		20% of DCC		$4,700
TOTAL INDIRECT CAPITAL COST				$21,000
TOTAL CAPITAL REQUIREMENT				$44,168

PRESENT WORTH

Interest Rate	7%	
Years	1	
TOTAL PRESENT WORTH		$45,000

Assumptions:

a Two-person crew (one senior and one professional), 2 days, 10-hour days

b The total volume of soil to be excavated is 100 cy (130 tons).

c Assumes 1 sample collected per 20 cubic yards.

d Disposal of 78 tons of contaminated soil at McKittrick's Class II Disposal Facility.

e Cost includes transportation, treatment (stabilization), and 10% county tax.

f 25-page report to be included in depot-wide closure report.

Table 9-10. SWMU 6 - Building 28 Sump
Alternative 4b - Excavation and Class I Disposal

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL EXCAVATION				
Engineering Oversight a	20	hour	$130	$2,600
Mobilization & Demobilization	1	lump sum	$15,000	$1,500
Site Preparation	1	lump sum	$500	$500
Temporary Fence	100	linear foot	$3	$300
Excavation b	130	ton	$30	$3,900
Imported Fill	78	ton	$6	$468
Backfilling and Compaction	130	ton	$30	$3,900
POST-EXCAVATION SAMPLING				
Sampling				
Personnel	12	hour	$60	$720
Sampling Material	1	lump sum	$500	$500
Analyses c	5	sample	$210	$1,050
CLASS II DISPOSAL FACILITY d				
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$300	$300
Disposal e	78	ton	$200	$15,600
CLOSURE REPORT f	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$34,138
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$2,100
Office Engineering During Construction		4% of DCC		$1,400
Non-Design Engineering		2% of DCC		$700
Construction Management		10% of DCC		$3,500
Contingency		30% of DCC		$10,300
Contract Administration		17% of DCC		$5,900
Contractor's Overhead and Profit		20% of DCC		$6,900
TOTAL INDIRECT CAPITAL COST				$30,800
TOTAL CAPITAL REQUIREMENT				$64,938

PRESENT WORTH

Interest Rate	7%
Years	1

TOTAL PRESENT WORTH	$65,000

Assumptions:

a Two-person crew (one senior and one professional), 2 days, 10-hour days
b The total volume of soil to be excavated is 100 cy (130 tons).
c Assumes 1 sample collected per 20 cubic yards.
d Disposal of 78 tons of contaminated soil at Chemical Management's Kettleman Hills Class I Disposal Facility.
e Cost includes transportation, treatment (stabilization), and 10% county tax.
f 25-page report to be included in depot-wide closure report.

Table 9-11. SWIVIU 7 - Burn Pit No. 1
Alternative 2 - Institutional Controls

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
Installation of Two New Monitoring Wells	1	lump sum	$17,000	$17,000
INDIRECT CAPITAL COSTS				
Land Use Restrictions	1	lump sum	$50,000	$50,000
TOTAL CAPITAL REQUIREMENT				$67,000
ANNUAL GROUNDWATER MONITORING COSTS a				
Chemical Analyses (Year 1)	1	lump sum	$12,000	$12,000
Chemical Analyses (Years 2-4)	1	lump sum	$9,000	$9,000
Fieldwork	1	lump sum	$10,000	$10,000
Reporting	1	lump sum	$15,000	$15,000
TOTAL ANNUAL MONITORING COSTS (YEAR 1)				$37,000
TOTAL ANNUAL MONITORING COSTS (YEARS 2 - 4)				$34,000
FIVE-YEAR SITE REVIEW				
Site Review Report				
Site Review Assessment and Report	1	lump sum	$10,000	$10,000
Contingency		20% O&M		$2,000
TOTAL 5-YEAR SITE REVIEW				$12,000
PRESENT WORTH				
Interest Rate			7%	
Years			10	
TOTAL PRESENT WORTH				$208,000

a Groundwater monitoring of the two new wells will be conducted.

Table 9-12. SWMU 8 - Burn Pit No. 2
Alternative 4 - Excavation and Class I Disposal

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL EXCAVATION				
Engineering Oversight a	100	hour	$130	$13,000
Mobilization & Demobilization	1	lump sum	$3,000	$3,000
Site Preparation	1	lump sum	$1,000	$1,000
Temporary Fence	800	linear foot	$3	$2,400
Excavation b	10,400	ton	$30	$312,000
Imported Fill	5,800	ton	$6	$34,800
Backfilling and Compaction	10,400	ton	$30	$312,000
POST-EXCAVATION SAMPLING				
Sampling				
Personnel	40	hour	$60	$2,400
Sampling Material	1	lump sum	$500	$500
Analyses c	80	sample	$210	$16,800
CLASS I DISPOSAL FACILITY d				
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$300	$300
Disposal e	3,400	ton	$200	$680,000
CLASS III DISPOSAL FACILITY f				
Pre-Disposal Lab Analytical Testingt Waste Profile	1	lump sum	$300	$300
Disposal g	2,400	ton	$30	$72,000
CLOSURE REPORT h	40	hour	$70	$2,800
GROUNDWATER MONITORING I				
Installation of Two New Monitoring Wells j				
Chemical Analyses	1	lump sum	$20,000	$20,000
Fieldwork	1	lump sum	$3,000	$3,000
Reporting	1	lump sum	$10,000	$10,000
	1	lump sum	$7,000	$7,000
TOTAL DIRECT CAPITAL COST (DCC)				$1,493,300

Table 9-12. (Continued)

INDIRECT CAPITAL COSTS

Engineering Design Services	6% of DCC	$89,600
Office Engineering During Construction	4% of DCC	$59,800
Non-Design Engineering	2% of DCC	$29,900
Construction Management	10% of DCC	$149,400
Contingency	30% of DCC	$448,000
Contract Administration	17% of DCC	$253,900
Contractor's Overhead and Profit	20% of DCC	$298,700
	TOTAL INDIRECT CAPITAL COST	$1,329,300
	TOTAL CAPITAL REQUIREMENT	$2,822,600

PRESENT WORTH

Interest Rate	7%	
Years	1	
TOTAL PRESENT WORTH		$2,823,000

Assumptions:

a Two-person crew (one senior and one professional), 10 days, 10-hour days

b Soil/debris volume to be excavated is approximately 8,000 cubic yards (10,400 tons). Approximately 5,800 tons is clean soil that can be backfilled; 3,400 tons is contaminated soil; 2,400 tons is uncontaminated debris.

c Assumes 1 sample collected per 100 cy.

d Disposal of 3,400 tons of contaminated soil at Chemical Waste Management's Kettleman Hills Class I Disposal Facility

e Cost includes transportation, treatment (stabilization), and 10% county tax.

f Disposal of 2,400 tons of uncontaminated debris (e.g., concrete, wood, etc.) at nearby municipal (Subtitle D) landfill.

g Cost includes transportation and 10% county tax.

h 25-page report to be included in depot-wide closure report.

i Groundwater monitoring will be conducted.

j One new well will be installed to replace LM97A which will be removed during excavation of the former burn pit. The second new well will be used to characterize the dieldrin plume downgradient of the site.

Table 9-13. SWMU 20 - Aboveground Solvent Tank/Building 26 Recoup Operations and Areal Building 10
Alternative 3 - SVE, Excavation and Class I Disposal

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
SOIL EXCAVATION				
Engineering Oversight a	40	hour	$130	$5,200
Mobilization & Demobilization	1	lump sum	$1,000	$1,000
Site Preparation	1	lump sum	$500	$500
Excavation b	320	ton	$30	$9,600
Imported Fill	320	ton	$6	$1,920
Backfilling and Compaction	320	ton	$30	$9,600
POST-EXCAVATION SAMPLING				
Sampling				
Personnel	20	hour	$60	$1,200
Sampling Material	1	lump sum	$500	$500
Analyses c	3	sample	$210	$630
CLASS I DISPOSAL FACILITY d				
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$300	$300
Disposal e	320	ton	$200	$64,000
CLOSURE REPORT f	40	hour	$70	$2,800
			Subtotal	$97,250
SOIL VAPOR EXTRACTION				
Construction Trailer (rental)	1	month	$500	$500
Mobilization/Demobilization	1	lump sum	$3,000	$3,000
Air Extraction Vents	1	lump sum	$18,000	$18,000
Collection Piping	50	linear foot	$20	$1,000
Blower System Rental	6	months	$2,000	$12,000
Labor	0.25	man-year	$75,000	$18,750
Air Effluent Testing	1	lump sum	$2,000	$2,000
Confirmation Sampling (Soil Gas)	1	lump sum	$2,000	$2,000
			Subtotal	$57,250
TOTAL DIRECT CAPITAL COST (DCC)				$154,500

Table 9-13. (Continued)

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$9,300
Office Engineering During Construction		4% of DCC		$6,200
Non-Design Engineering		2% of DCC		$3,100
Construction Management		10% of DCC		$15,500
Contingency		30% of DCC		$46,400
Contract Administration		17% of DCC		$26,300
Contractor's Overhead and Profit		20% of DCC		$30,900
	TOTAL INDIRECT CAPITAL COST			$137,700
	TOTAL CAPITAL REQUIREMENT			$292,200
PRESENT WORTH				
		Interest Rate	7%	
		Years	1	
		TOTAL PRESENT WORTH		$293,000

Assumptions:
a Two-person crew (one senior and one professional), 4 days, 10-hour days
b The floor drain located within Building 26, and the sumps at Manholes W-1 and W-3 will be excavated which represents approximately 320 tons of soil concrete.
c Assumes 3 sample collected
d Disposal at Chemical Waste Management's Kettleman Hills Class I Disposal Facility
e Cost includes transportation, treatment (stabilization), and 10% county tax.
f 25-page report to be included in depot-wide closure report.

Table 9-14. SWMU 24 - Building 247 Petroleum Laboratory Waste Oil
Alternative 3 - Bioventing

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
BIOVENTING				
Construction Trailer (rental)	1	month	$500	$500
Mobilization/Demobilization	1	lump sum	$3,000	$3,000
Air Injection Vent	1	lump sum	$14,000	$14,000
Collection Piping	20	linear foot	$20	$400
Blowers	1	each	$2,000	$2,000
Gauges, Valves, etc.	1	lump sum	$500	$500
Equipment Pads	1	each	2,500	$2,500
Treatability Study	1	lump sum	$10,000	$10,000
GROUNDWATER MONITORING a				
Chemical Analyses	1	lump sum	$1,000	$1,000
Fieldwork	1	lump sum	$5,000	$5,000
Reporting	1	lump sum	$5,000	$5,000
CLOSURE REPORT b	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$46,700
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$2,900
Office Engineering During Construction		4% of DCC		$1,900
Non-Design Engineering		2% of DCC		$1,000
Construction Management		10% of DCC		$4,700
Contingency		30% of DCC		$14,100
Contract Administration		17% of DCC		$8,000
Contractor's Overhead and Profit		20% of DCC		$9,400
TOTAL INDIRECT CAPITAL COST				$42,000
TOTAL CAPITAL REQUIREMENT				$88,700

ANNUAL OPERATION AND MAINTENANCE COSTS

Energy	3,500	kw-hr	$0.10	$350
Labor	0.5	man-year	$75,000	$37,500
Maintenance Materials	1	lump sum	$2,000	$2,000
	TOTAL O&M COSTS			$39,850

PRESENT WORTH

Interest Rate	7%	
Years	2	
TOTAL PRESENT WORTH		$166,000

Assumptions:
a Groundwater monitoring of LM118A will be conducted.
b 25-page report to be included in depot-wide report.

Table 9-15. SWMU 27 - Building 206 Roundhouse Sump/Area 1 Building 206
Alternative 3 - Excavation and Class I Disposal

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
Construction Costs				
SOIL EXCAVATION				
Engineering Oversight a	20	hour	$130	$2,600
Mobilization & Demobilization	1	lump sum	$3,000	$3,000
Site Preparation	1	lump sum	$1,000	$1,000
Excavation b	170	ton	$30	$5,100
Imported Fill	170	ton	$6	$1,020
Backfilling and Compaction	170	ton	$30	$5,100
POST-EXCAVATION SAMPLING				
Sampling				
Personnel	16	hour	$60	$960
Sampling Material	1	lump sum	$500	$500
Analyses c	8	sample	$210	$1,680
CLASS I DISPOSAL FACILITY d				
Field Sampling	10	hour	$60	$600
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$300	$300
Disposal e	170	ton	$200	$34,000
CLOSURE REPORT f	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$58,660
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$3,600
Office Engineering During Construction		4% of DCC		$2,400
Non-Design Engineering		2% of DCC		$1,200
Construction Management		10% of DCC		$5,900
Contingency		30% of DCC		$17,600
Contract Administration		17% of DCC		$10,000
Contractor's Overhead and Profit		20% of DCC		$11,800
TOTAL INDIRECT CAPITAL COST				$52,500
TOTAL CAPITAL REQUIREMENT				$111,160

PRESENT WORTH

Interest Rate	7%
Years	1

TOTAL PRESENT WORTH	$112,000

Assumptions:

a Two-person crew (one senior and one professional), 2 days, 10-hour days

b Area to be excavated includes one sump, one hot spot of soil contamination, and one area of railroad tracks; approximately 130 cubic yards (170 tons).

c Assumes 8 sample collected.

d Disposal at Chemical Waste Management's Kettleman Hills Class I Disposal Facility

e Cost includes transportation, treatment (stabilization), and 10% county tax.

f 25-page report to be included in depot-wide closure report.

Table 9-16. Drum Storage Area - Building 30
Alternative 2 - Institutional Controls

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
Installation of One New Monitoring Well	1	lump sum	$10,000	$10,000
INDIRECT CAPITAL COSTS				
Land Use Restrictions	1	lump sum	$50,000	$50,000
	TOTAL CAPITAL REQUIREMENT			$60,000
ANNUAL GROUNDWATER MONITORING COSTS a				
Chemical Analyses	1	lump sum	$2,000	$2,000
Fieldwork	1	lump sum	$5,000	$5,000
Reporting	1	lump sum	$5,000	$5,000
	TOTAL ANNUAL MONITORING COSTS			$12,000
FIVE-YEAR SITE REVIEW				
Site Review Report				
Site Review Assessment and Report	1	lump sum	$10,000	$10,000
Contingency		20% of DCC		$2,000
	TOTAL 5-YEAR SITE REVIEW			$12,000
PRESENT WORTH				
		Interest Rate	7%	
		Years	10	
	TOTAL PRESENT WORTH			$87,000

Assumptions:
a The new well will be monitored for SVOCs on a quarterly basis for one year.

Table 9-17. Surface and Near-Surface Soils - Northern Depot Area
Alternative 3 - Asphalt Cover
DDJC-Tracy, Comprehensive RVFS

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
ASPHALT COVER-SURFACE AND NEAR-SURFACE SOILS				
Asphalt a,b	138,000	square foot	$2.00	$276,000
ASPHALT PAVEMENT FOR ROADWAY				
Asphalt a,b	9,700	square foot	$2.00	$19,400
CLOSURE REPORT c	40	hour	$70	$2,800
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$17,900
Office Engineering During Construction		4% of DCC		$12,000
Non-Design Engineering		2% of DCC		$6,000
Construction Management		10% of DCC		$29,900
Contingency		10% of DCC		$29,900
Contract Administration		17% of DCC		$50,700
Contractor's Overhead and Profit		20% of DCC		$59,700
	TOTAL INDIRECT CAPITAL COST			$206,100
	TOTAL CAPITAL REQUIREMENT			$504,300
PRESENT WORTH				
		Interest Rate	7%	
		Years	1	
		TOTAL PRESENT WORTH		$504,000

Assumptions:
a Asphalt unit cost based on quote from Capital Asphalt Construction, Inc., Stockton, CA, for 4 inches of asphalt and 4 inches of aggregate base; unit cost includes grading and compaction.
b It is assumed that drainage controls are not needed.
c 25-page report to be included in depot-wide closure report.

Table 9-18. SWMU 2/3 - Sewage and Industrial Waste Lagoons
Alternative 3 - Excavation and Class I Disposal

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
Construction Costs				
SOIL EXCAVATION				
Engineering Oversight a	1	hour	$77,200	$77,200
Mobilization & Demobilization	1	lump sum	$15,000	$15,000
Site Preparation	1	lump sum	$12,941	$12,941
Excavation b	15067	ton	$9.23	$139,000
POST-EXCAVATION SAMPLING				
Sampling				
Analyses	1	lump sum	$355,400	$355,400
CLASS I DISPOSAL FACILITY d				
Pre-Disposal Lab Analytical Testing/ Waste Profile	1	lump sum	$240,300	$240,300
Disposal e	15,067	ton	$75.50	$1,137,800
CLOSURE REPORT f	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$1,980,500
INDIRECT CAPITAL COSTS				
Engineering Design Services		6% of DCC		$11,880
TOTAL INDIRECT CAPITAL COST				$11,880
TOTAL CAPITAL REQUIREMENT				$1,992,380

PRESENT WORTH

Interest Rate	7%	
Years	1	
TOTAL PRESENT WORTH		$2,132,000

Assumptions:

a Two-person crew (one senior and one professional), 2 days, 10-hour days

b Area to be excavated includes one sump, one hot spot of soil contamination, and one area of railroad tracks; approximately 130 cubic yards (170 tons).

c Assumes 8 sample collected.

d Disposal at Chemical Waste Management's Kettleman Hills Class I Disposal Facility

e Cost includes transportation, treatment (stabilization), and 10% county tax.

f 25-page report to be included in depot-wide closure report.

Table 9-19. SWMU 33 - Industrial Waste Pipeline
Alternative 3 - Excavation, Grouting, and Institutional Controls

Item Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
DIRECT CAPITAL COSTS				
Construction Costs				
SOIL EXCAVATION				
Engineering Oversight a	20	Hour	$130	$2,600
Mobilization & Demobilization	1	Lump sum	$15,000	$15,000
Grouting	1	Lump sum	$37,300	$1,000
Excavation b	170	Ton	$31	$5,200
Site Restoration	1	Lump sum	$1,000	$1,000
Pier Drilling	1	Lump sum	$78,500	$78,500
Hydroflush IWPL	1	Lump sum	$7,500	$7,500
POST-EXCAVATION SAMPLING				
Sampling & Analyses c	1	Lump sum	$23,700	$23,700
CLASS I DISPOSAL FACILITY d				
Waste Profile			$	
Disposal e	1	Lump sum	$27,200	$27,200
CLOSURE REPORT f	40	hour	$70	$2,800
TOTAL DIRECT CAPITAL COST (DCC)				$164,500
ANNUAL MONITORING (5 years)	1	Lump sum	$65,000	$65,000
TOTAL CAPITAL REQUIREMENT				$229,500
PRESENT WORTH				
		Interest Rate	7%	
		Years	1	
		TOTAL PRESENT WORTH		$245,600

Assumptions:
a Two-person crew (one senior and one professional), 2 days, 10-hour days
b Area to be excavated includes one sump, one hot spot of soil contamination, and one area of railroad tracks; approximately 130 cubic yards (170 tons).
c Assumes 8 sample collected.
d Disposal at Chemical Waste Management's Kettleman Hills Class I Disposal Facility
e Cost includes transportation, treatment (stabilization), and 10% county tax.
f 25-page report to be included in depot-wide closure report.

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10.0 STATUTORY DETERMINATIONS

10.1 Sites Recommended for No Further Action

Twenty-one sites at Defense Depot San Joaquin (DDJC)-Tracy were recommended in the comprehensive Remedial Investigation/Feasibility Study (RI/FS) for no further action due to the absence of contamination (see Table 9-1). Two additional sites, solid waste management units (SWMUs) 10A and 14, and 23 were recommended for no further action because there is not an unacceptable risk to human health or the environment and the cost of a remedial alternative is prohibitive (see Table 7-15). Because no remedial actions are required for these sites, no discussion of statutory requirements is needed.

10.2 Statutory Requirements

Section 9.0 identifies the selected remedy for each site recommended for remedial action. This section discusses how each selected remedy meets the statutory requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121. Specifically, a remedy should:

- Protect human health and the environment;
- Comply with Applicable or Relevant and Appropriate Requirements (ARARs) (or justify an ARAR waiver);
- Be cost-effective;
- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable (also includes agency and community acceptance); and
- Satisfy the preference for treatment to reduce toxicity, mobility, or volume as a principal element (or explain why this preference is not valid).

10.3 Operable Unit (OU)1 Groundwater

The selected remedy (Alternative 3) modifies the OU 1 groundwater treatment system by installing groundwater extraction wells in the three areas of dieldrin contamination (near SWMUs 2 and 3, SWMU 8, and within the Tracy Annex). Granular activated carbon (GAC) will be used to remove the pesticides.

10.3.1 Protection of Human Health and the Environment

The selected remedy extracts and treats groundwater from each of the three identified areas of dieldrin contamination. Modeling results predict that the cleanup standard of 0.05 micrograms per liter (Ig/L) for dieldrin will be met in approximately 50 years at SWMUs 2/3 and 8. However, more than 50 years will be required to reduce the concentrations in the Tracy Annex below the cleanup standard. Because dieldrin has low mobility and is, therefore, difficult to extract, a more aggressive pumping strategy will not significantly affect the cleanup time. The selected remedy will contain the dieldrin until the cleanup standard is met and is, therefore, protective of human health and the environment.

10.3.2 Compliance With ARARs

The selected remedy complies with all federal and state ARARs. The cleanup standards specified in the OU1 ROD (WCC, 1993) are consistent with chemical-specific ARARs as follows:

Chemical	Aquifer Cleanup Standard	Basis
DCE	6.0 I/L	California MCL
PCE	5.0 I/L	Federal MCL
TCE	5.0 I/L	Federal MCL

No ARAR waivers are necessary. No chemical-specific ARARs (i.e., Maximum Contaminant Levels [MCLs]) have been identified for dieldrin. The California Action Level of 0.05 Ig/L for dieldrin is a performance standard. The location-specific ARARs identified for this site are listed in Table 10-1. Action-specific ARARs for groundwater extraction and treatment are listed in Table 10-2.

10.3.3 Cost-effectiveness

Groundwater extraction with GAC is the only treatment alternative considered effective at OU 1. Air stripping would remove the volatile organic compounds (VOCs) but would not remove the dieldrin in the groundwater. GAC would remove both dieldrin and VOCs. The incremental cost of adding treatment for dieldrin is small compared to the total treatment system cost. Alternative 3, the selected remedy, is the only alternative that addresses all three areas of dieldrin contamination. It provides the best overall effectiveness proportional to the cost ($2,528,000) and is therefore considered cost-effective. Reinjecting groundwater at this site also is proposed as a cost-effective means for disposal of treated water.

10.3.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.3.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected remedy provides greater long-term effectiveness and permanence than the other alternatives. The mobility of the contaminants will be controlled through extraction, and treatment will be used to remove the dieldrin from the aquifer permanently. The remedy provides short-term effectiveness, is readily implementable, and is considered the most cost-effective (although the most costly) of the alternatives. No cost effective treatment technologies with proven effectiveness were identified. No resource recovery techniques were appropriate for dilute VOCs and pesticides.

10.3.4.2 The state and the United States Environmental Protection Agency (U.S. EPA) have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this Record of Decision (ROD).

10.3.4.3 One public comment was received questioning the capacity of the reinjection wells and the cost of groundwater treatment (refer to Responsiveness Summary for discussion).

10.3.5 Preference for Treatment as a Principal Element

The use of groundwater extraction, followed by treatment by carbon (and air stripping if VOCs are present) satisfies the statutory preference for the use of remedies that include treatment as a principal element.

10.4 Group A Sites

The Group A Sites (SWMU 1/Area 2, Area 1 Building 237, and Area 3) are considered potential sources of VOCs to OU 1 groundwater. The selected remedy for the Group A sites is soil vapor extraction (SVE)(Alternative 3).

10.4.1 Protection of Human Health and the Environment

The selected remedy is one of the two alternatives considered the most protective of human health and the environment. In the selected remedy, VOCs are extracted from the soil and treatment is provided at the surface to control air emissions.

10.4.2 Compliance With ARARs

10.4.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for the Group A sites are listed in Table 10-1. Action-specific ARARs for SVE are listed in Table 10-3.

10.4.2.2 Background threshold concentrations and beneficial use numerical limits for the Group A sites are listed in Table 7-1. Tables 10-4, 10-5, and 10-6 provide, for SWMU 1/ Area 2, Area 1 Building 237, and Area 3, respectively, an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards developed. These standards were developed meet ARARs and to protect background groundwater quality and beneficial uses in a way consistent with the performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.4.3 Cost-effectiveness

Only Alternatives 3 and 4 are protective of human health and the environment; however, Alternative 3 is much less costly to implement than Alternative 4. Alternative 3 is estimated to cost $648,000, whereas Alternative 4 is estimated at $42,054,000. Because Alternative 3 provides comparable effectiveness to Alternative 4 at a much lower cost, Alternative 3 is considered cost-effective. Also, the VOCs in the soils at the Group A sites may be a continuing source of VOCs in groundwater at OU 1. Therefore, remediating the Group A sites may significantly reduce the cost of groundwater remediation at OU 1 by decreasing aquifer cleanup times.

10.4.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.4.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. Alternatives 3 (SVE) and 4 (excavation) both satisfy the threshold criteria. Alternative 3 was selected over Alternative 4 because it utilizes treatment to remove the contaminants and is much more cost-effective. The selected alternative provides long-term effectiveness and permanence; reduces the toxicity, mobility, and volume of the contaminants; provides short-term effectiveness; is readily implementable; and is considered the most cost-effective of the alternatives. Alternative treatment methods were not considered because SVE has been identified as the presumptive method for treating VOCs in vadose zone soils. No economical method of recovering the VOCs was identified.

10.4.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3.

10.4.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.4.5 Preference for Treatment as a Principal Element

The use of SVE, followed by emissions treatment, satisfies the statutory preference for the use of remedies that include treatment as a principal element.

10.5 SWMU 4-Storm Drain Lagoon

The selected remedy is excavation with off-site disposal of the sediments (Alternative 3). All sediment excavated from the bottom of the storm drain lagoon will be disposed of off-site.

10.5.1 Protection of Human Health and the Environment

The selected remedy is the only alternative that removes chemicals of concern (COCs) (metals and pesticides) from the lagoon. Confirmation samples will be collected to ensure that the excavation is protective of the environment. By combining the action proposed in this ROD with the appropriate best management practices for stormwater pollution prevention, long-term protection can be achieved. The lagoon will remain in use as part of the DDJC-Tracy stormwater system.

10.5.2 Compliance With ARARs

10.5.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for excavation and disposal are listed in Table 10-3.

10.5.2.2 Background threshold concentrations and beneficial use numerical limits for SWMU 4 are listed in Table 7-1. Table 10-7 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994). Table 10-8 identifies chemical-specific disposal requirements.

10.5.2.3 The remedy includes the construction of a sediment trap and overflow weir to comply with the narrative toxicity water quality objective for inland surface waters (Cal-EPA CVRWQCB, 1994). National Ambient Water Quality Criteria to protect freshwater life will be used as performance standards to evaluate the success of the selected remedy.

10.5.3 Cost-effectiveness

Alternative 3 is the only alternative protective of human health and the environment. Therefore, this alternative provides the most overall effectiveness relative to its cost of $552,700.

10.5.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.5.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence that is better or comparable to the other alternatives (because they do not remove the existing contamination). Potential risks to ecological receptors from pesticides and metals in surface soil are reduced to a hazard index of 10 (see Table 10-7). Excavation is used to remove the sediment from the lagoon permanently. The five-year review process will be used to assess the possibility of a continuing low-level source. The remedy provides short-term effectiveness, is readily implementable, and is considered cost-effective. When combined with the appropriate best management practices as part of the DDJC-Tracy stormwater program, this alternative best satisfies the five balancing criteria. No cost-effective alternative technologies or recovery techniques for treating low concentrations of pesticides were identified.

10.5.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this ROD.

10.5.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.5.5 Preference for Treatment as a Principal Element

The selected remedy relies on excavation with off-site disposal rather than treatment. No appropriate in situ methods were identified for treating the SVOCs and pesticides in the sediment at the bottom of the lagoon. Treating the excavated soil (on or off site) is not cost-effective due to the relatively small quantity of soil excavated, the cost for tests to identify an appropriate treatment process, and the cost of treatment.

10.6 SWMU 6-Building 28 Sump

The selected remedy is excavating the contaminated soils and disposing of them at an off-site disposal facility (Alternative 4).

10.6.1 Protection of Human Health and the Environment

The selected remedy removes the potential threats that pesticides pose to the beneficial uses of groundwater and background groundwater quality. The selected remedy is considered the most effective of the alternatives for protecting human health and the environment.

10.6.2 Compliance With ARARs

10.6.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for excavation and disposal are listed in Table 10-3.

10.6.2.2 Background threshold concentrations and beneficial use numerical limits for SWMU 6 are listed in Table 7-1. Table 10-9 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to meet ARARs and protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.6.3 Cost-effectiveness

Only Alternatives 3 and 4 are protective of human health and the environment; however, Alternative 4 is much less costly to implement than Alternative 3. Alternative 4 is estimated to cost between $45,000 and $65,000, whereas Alternative 3 is estimated at $169,000. Because the selected excavation and off-site disposal action of Alternative 4 provides comparable or better effectiveness than Alternative 3 at lower cost, Alternative 4 is considered a cost-effective remedy. In addition, excavation probably costs less than maintaining the long-term institutional controls of Alternative 2.

10.6.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.6.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence, reduces the volume of the contaminants, provides short-term effectiveness, is readily implementable, and is considered cost-effective. No cost-effective alternative treatment technologies or resource recovery techniques were identified for low levels of pesticide contamination.

10.6.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 4 as recommended in this ROD.

10.6.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.6.5 Preference for Treatment as a Principal Element

The selected remedy relies on excavation with off-site disposal rather than treatment. No appropriate in situ methods were identified for treating the pesticides in the soil. Treating the excavated soil (on or off site) would not be cost-effective due to the relatively small quantity of soil excavated, the cost for tests to identify an appropriate treatment process, and the cost of treatment. In situ stabilization is considered in Alternative 3 as a treatment option, but there are uncertainties regarding its long-term effectiveness and it is less cost-effective.

10.7 SWMU 7-Burn Pit No. 1

The selected remedy for SWMU 7 is institutional controls (Alternative 2). The planned institutional controls include land use restrictions around the disposal pits. The restrictions would designate the land for industrial use and prevent its use for schools, hospitals, playgrounds, or housing until COCs are below levels of concern. The institutional controls also restrict construction in and the demolition of Buildings 19 and 21. In addition, the remedy includes the use of monitoring to evaluate the effectiveness of these controls in protecting the beneficial uses of groundwater.

10.7.1 Protection of Human Health and the Environment

The selected remedy is protective of human health for both current and future exposure scenarios. Groundwater monitoring is used to identify potential impacts to groundwater that were identified in the water quality site assessment. The analyte concentrations that would require analysis in the Well Monitoring Program are specified in Section 9.5.3. Institutional controls for Buildings 19 and 21 and groundwater monitoring are continued at least until the first five-year review and the need for continued controls will be reevaluated at that time.

10.7.2 Compliance With ARARs

10.7.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for institutional controls are listed in Table 10-3.

10.7.2.2 Background threshold concentrations and beneficial use numerical limits for SWMU 7 are listed in Table 7-1. Table 10-10 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect groundwater quality and beneficial uses, consistent with the chemical-specific in performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.7.3 Cost-effectiveness

Alternatives 2 through 4 are considered protective of human health and the environment. Long-term threats to groundwater have not been confirmed and the long-term monitoring of the selected remedy (Alternative 2) would identify any potential concerns and require discussing in the Well Monitoring Program if a concern is identified. The selected remedy costs $208,000 to implement; Alternatives 3 and 4 cost significantly more at $822,000 and $2,605,000 respectively. Therefore, the selected remedy provides the most cost-effective remedy at SWMU 7.

10.7.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.7.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. Given that groundwater contamination has not been detected and much of the soil is underneath Buildings 15, 18, 19 and 21, the cost of a more aggressive alternative does not appear warranted. The long-term effectiveness is assessed through monitoring. The toxicity, mobility, and volume of contaminants will not be reduced; however, much of the soil is already covered by pavement or buildings, so contaminant migration is limited. The selected remedy provides short-term effectiveness, is readily implementable, and is considered cost-effective. No cost-effective alternative treatment technologies or resource recovery techniques were identified for low levels of pesticide contamination.

10.7.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 2 as recommended in this ROD.

10.7.4.3 One public comment expressed concern over the cost of excavation (Alternative 4) and potential exposure to excavated soils. The comment also expressed interest in encapsulation (Alternative 3) (refer to Responsiveness Summary for discussion).

10.7.5 Preference for Treatment as a Principal Element

The selected remedy relies on institutional controls rather than treatment. The potential threat to the beneficial uses; of groundwater has not been confirmed through historical monitoring. Also, portions of the SWMU 7 burial pits are covered by buildings. Treatment would be expensive and very difficult to implement at this site.

10.8 SWMU 8-Burn Pit No. 2

The selected remedy is excavating the contaminated soils from the former burn pit and disposing of them at a Class I disposal facility (Alternative 4).

10.8.1 Protection of Human Health and the Environment

The selected remedy provides the greatest protection of human health and the environment. Contaminated soils (containing SVOCs, pesticides, herbicides, and petroleum hydrocarbons) are permanently removed from the site and disposed of at a Class I disposal facility.

10.8.2 Compliance With ARARs

10.8.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for excavation and disposal are listed in Table 10-3.

10.8.2.2 Background threshold values and beneficial use numerical limits for SWMU 8 are listed in Table 7-1. Table 10-11 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.8.3 Cost-effectiveness

Only Alternative 4 is protective of human health and the environment. The estimated cost for Alternative 4 is $2,823,000. SWMU 8 is a major potential source area for dieldrin contamination in groundwater at OU 1. As explained in Section 10.4.3, it is considered more cost-effective to address source areas than to extend operation of the OU 1 groundwater treatment system. Therefore, the selected excavation and off-site disposal action of Alternative 4 is considered a cost-effective remedy.

10.8.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.8.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence, reduces the volume of the contaminants, provides short-term effectiveness, is readily implementable, and is considered cost-effective. None of the other alternatives satisfied the threshold criteria as well as the selected remedy. There is a trade-off between cost and satisfying the other four balancing criteria. The additional cost is considered justified, and the alternative is considered cost-effective. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of pesticide contamination.

10.8.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 4 as recommended in this ROD.

10.8.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.8.5 Preference for Treatment as a Principal Element

The selected remedy relies on excavation with off-site disposal rather than treatment. No appropriate in situ methods were identified for treating the pesticides in the soil. Bioventing was evaluated, but was not as effective as the selected remedy in addressing pesticide contamination at the site (dieldrin is of particular concern).

10.9 SWMU 20 Aboveground Solvent Tank
Building 26 Recoup Operations and Area 1
Building 10

The selected remedy includes soil vapor extraction, excavation with disposal at a Class I disposal facility, and natural attenuation (Alternative 3).

10.9.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment. A portion of the contaminated soils (containing SVOCs, pesticides, and petroleum hydrocarbons) is permanently removed from the site and disposed of at a Class I disposal facility. The remaining soils are treated by SVE and natural attenuation. The selected remedy addresses all existing site risks and potential impacts to groundwater.

10.9.2 Compliance With ARARs

10.9.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for SVE and excavation and disposal are listed in Table 10-3.

10.9.2.2 Background threshold values and beneficial use numerical limits for SWMU 20 are listed in Table 7-1. Table 10-12 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.9.3 Cost-effectiveness

Only Alternatives 3 and 4 are protective of human health and the environment. Alternative 3, soil vapor extraction with excavation, provides comparable effectiveness to the larger excavation remedy of Alternative 4; however, Alternative 3 is less costly to implement. Alternative 3 is estimated to cost $293,000, whereas Alternative 4 is estimated at $355,000. Therefore, Alternative 3 is considered the most cost-effective alternative.

10.9.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.9.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence, reduces the volume of the contaminants, provides short-term effectiveness, is readily implementable, and is considered cost-effective. A larger excavation (Alternative 4) could be marginally more effective, but is also more difficult to implement and more expensive. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of pesticide contamination.

10.9.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this ROD.

10.9.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.9.5 Preference for Treatment as a Principal Element

The selected remedy relies on a combination of treatment (SVE), excavation with off-site disposal, and natural attenuation. The excavation is limited and addresses the soil beneath the sumps and floor drains associated with Buildings 10 and 26. The phenols are expected to attenuate naturally. Per the request of the Regional Water Quality Control Board (RWQCB), predesign soil-gas sampling will be performed in areas designated for SVE remediation and the results may expand the size of the area targeted for SVE treatment.

10.10 SWMU 24-Petroleum Waste Oil Tank

The selected remedy for SWMU 24 is bioventing (Alternative 3). However, predesign soil gas sampling will be conducted to determine if SVE also needs to be implemented.

10.10.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment. Potential threats to background groundwater quality and beneficial uses from VOCs, SVOCs, and petroleum hydrocarbons are permanently eliminated. Although bioventing does not enhance the biodegradation of polychlorinated biphenyls (PCBs), the threat posed to groundwater by PCBs is low relative to the threat posed by other COCs. The remedy includes three quarters of monitoring data to assess the natural attenuation of petroleum hydrocarbons in groundwater. Potential risks to future depot workers are eliminated by this remedy.

10.10.2 Compliance With ARARs

10.10.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for bioventing are listed in Table 10-3.

10.10.2.2 Background threshold values and beneficial use numerical limits for SWMU 24 are listed in Table 7-1. Table 10-13 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.10.3 Cost-effectiveness

Alternative 4 is considered cost-effective because pesticides and PCBs are permanently removed from the site. Alternatives 3 and 5 are also considered cost-effective because long-term threats to groundwater from pesticides and PCBs are considered relatively low at SWMU 24. Alternative 3 is the least costly of these alternatives to implement ($166,000 as compared to $214,000 for Alternative 4 and $263,000 for Alternative 5). Therefore, Alternative 3 provides the most cost-effective remedy for the site.

10.10.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.10.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence, reduces the toxicity and volume of the contaminants, provides short-term effectiveness, is readily implementable, and is considered cost-effective. Excavation (Alternatives 4 and 5) is only marginally more effective, more difficult to implement (since excavation under Building 247 would be required), and more costly. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of pesticide contamination.

10.10.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this ROD.

10.10.4.3 One public comment expressing concern over the high cost of excavation (Alternatives 4 and 5) and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.10.5 Preference for Treatment as a Principal Element

The use of bioventing satisfies the statutory preference for the use of remedies that include treatment as a principal element.

10.11 SMU 27-Building 206
Roundhouse Sump/Area 1
Building 206

The selected remedy is excavating contaminated soil and disposing of it at a Class I disposal facility (Alternative 3).

10.11.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment. Potential threats to background groundwater quality and beneficial uses from VOCs, pesticides, and herbicides are permanently eliminated. Potential risks to future depot workers and the environment are also eliminated.

10.11.2 Compliance With ARARs

10.11.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific

ARARs for excavation and disposal are listed in Table 10-3.

10.11.2.2 Background threshold limits and beneficial use numerical limits for SWMU 27 are listed in Table 7-1. Table 10-14 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.11.3 Cost-effectiveness

Alternative 3 is the only alternative protective of human health and the environment and therefore provides the most overall effectiveness relative to its cost of $112,000. Depending on the level of contamination in the excavated soil, Alternative 3 may be less expensive than the long-term costs of implementing institutional controls.

10.11.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.11.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence, reduces the volume of the contaminants, provides short-term effectiveness, is readily implementable, and is considered cost-effective. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of pesticide contamination.

10.11.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this ROD.

10.11.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.11.5 Preference for Treatment as a Principal Element

The selected remedy relies on excavation with off-site disposal rather than treatment. No appropriate in situ methods were identified for treating the pesticides in the soil. Treating the excavated soil (on or off site) will not be cost-effective due to the relatively small quantity of soil excavated, the cost for tests to identify an appropriate treatment process, and the cost of treatment.

10.12 Building 30 Drum Storage Area

The selected remedy for the Building 30 Drum Storage Area is institutioned controls with groundwater monitoring (Alternative 2).

10.12.1 Protection of Human Health and the Environment

Baseline risk assessment results do not indicate potential adverse risks to depot workers or future construction workers. A potential threat to background groundwater quality was identified; however, the COCs have not been detected in the groundwater at this site. Modeling suggests a future threat to groundwater is possible. The selected remedy protects human health and the environment by requiring monitoring and discussion in the Well Monitoring Program if a concern is identified. The analyte concentrations that would require analysis in the Well Monitoring Program are identified in Section 9.5.8.

10.12.2 Compliance With ARARs

10.12.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for institutional controls are listed in Table 10-3.

10.12.2.2 Background threshold concentrations and beneficial use numerical limits for the

Building 30 Drum Storage Area are listed in Table 7-1. Table 10-15 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses, consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.12.3 Cost-effectiveness

Alternatives 2 and 3 are considered protective of human health and the environment. Long-term threats to groundwater from the drum storage area have not been confirmed and the long-term monitoring of Alternative 2 would identify any future concerns. Alternative 2, institutional controls, costs $87,000 to implement. Alternative 3, excavation and off-site disposal, costs significantly more at $1,860,000. Excavation is considered cost-prohibitive because of the difficulty of excavating beneath a building where sensitive robotics activities are conducted. Therefore, Alternative 2 provides the most cost-effective remedy for the site.

10.12.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.12.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence, provides short-term effectiveness as groundwater monitoring will identify any short-term impacts, is readily implementable, and is considered cost-effective. To ensure that the threshold criteria are met, the institutional controls include installing a monitoring well and quarterly monitoring for SVOCs for one year to confirm that there is no threat to background groundwater quality. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of phthalate contamination.

10.12.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 2 as recommended in this ROD.

10.12.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.12.5 Preference for Treatment as a Principal Element

The selected remedy relies on institutional controls rather than treatment. The potential threat to the beneficial uses of groundwater has not been confirmed through historical monitoring. Further groundwater monitoring will be performed to assess the success of institutional controls.

10.13 Surface and Near-Surface Soils-Northern Depot Area

The selected remedy for the surface and near-surface soils in the Northern Depot Area is installing an asphalt cover (Alternative 3).

10.13.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment. No impacts to background groundwater quality or beneficial uses were identified at this site. The installation of an asphalt cap, to be maintained by DDJC-Tracy, will prevent depot workers (grader operators) from being exposed to arsenic and manganese in the surface and near-surface soils in the area. The lifetime of the cap is estimated at 20 years as long as annual or semiannual sealing is provided.

10.13.2 Compliance With ARARs

The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for asphalt cover installation are listed in Table 10-3. No COCs were identified as impacting groundwater quality at this site. The cleanup standards (Section 9.5.9.3) correspond to a hazard index of 1.0 for grader operators.

10.13.3 Cost-effectiveness

Alternatives 3 and 4 are the only alternatives that provide long-term effectiveness for the surface and near-surface soils in the Northern Depot Area. Alternative 3, asphalt paving, costs significantly less than the excavation and off-site disposal proposed in Alternative 4. Alternative 3 is estimated at $504,000, whereas Alternative 4 is estimated to cost between $769,000 and $995,000, depending on the level of contamination in the soil. Because Alternative 3 provides comparable worker protection to Alternative 4, Alternative 3 is considered highly effective relative to its cost.

10.13.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.13.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected alternative provides long-term effectiveness and permanence (the asphalt cover will need to be maintained by DDJC-Tracy), reduces the mobility of the contaminants, provides short-term effectiveness, is readily implementable, and is considered cost-effective. No alternative treatment technologies or recovery techniques were identified for low levels of disperse metals.

10.13.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this ROD.

10.13.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.13.5 Preference for Treatment as a Principal Element

The selected remedy relies on containment rather than treatment. The asphalt cover will protect workers from exposure to arsenic and manganese in the soils. The size of the Northern Depot Area and nature of the contamination preclude a cost-effective approach for treatment.

10.14 SWMUs 2 and 3-Sewage and Industrial Waste Lagoons

The selected remedy is excavation with off-site disposal (Alternative 3).

10.14.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment. Risks to human health and threats to beneficial uses and background groundwater quality are addressed by excavation. Impacts to ecological receptors will be addressed by installing a geofabric filter and clean backfill to isolate contaminants from receptors.

10.14.2 Compliance With ARARs

10.14.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action-specific ARARs for institutional controls are listed in Table 10-3.

10.14.2.2 Background threshold values and beneficial use numerical limits for SWMUs 2/3 are listed in Table 7-1. Table 10-16 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.14.3 Cost-effectiveness

The selected remedy is the only alternative that is protective of human health and the environment. The estimated cost is approximately $2,100,000. It is considered more cost-effective to address the soil source area than to extend the operation of the OU 1 groundwater treatment system. Therefore, excavation and off-site disposal is considered a cost-effective remedy.

10.14.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.14.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected remedy provides short- and long-term effectiveness and permanence, reduces the volume of the contaminants, is readily implementable, and is considered cost-effective. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of pesticide contamination.

10.14.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 3 as recommended in this ROD.

10.14.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.14.5 Preference for Treatment as a Principal Element

The selected remedy relies on excavation rather than treatment. No appropriate in situ methods were identified for permanently treating the pesticides in the soils.

10.15 SWMU 33-Industrial Waste Pipeline (IWPL)

The selected remedy for the IWPL is grouting, limited excavation, and institutional controls (Alternative 3). The institutional controls include groundwater monitoring to identify potential impacts to background groundwater quality from the aldrin, dieldrin, diethylphthalate, and di-n-butylphthalate that will remain after the excavation is completed. Section 9.6.2 identifies the beneficial use limits that cannot be exceeded in the groundwater samples without requiring discussion in the Well Monitoring Program.

10.15.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment. No risks to human health or ecological receptors were identified for SWMU 33. A portion of the contaminants will be removed in the excavation. Groundwater monitoring is specified to assess any impact of the residual soils on groundwater quality.

10.15.2 Compliance With ARARs

10.15.2.1 The selected remedy complies with all federal and state ARARs. No ARAR waivers are necessary. Location-specific ARARs for this site are listed in Table 10-1. Action specific ARARs for excavation and institutional controls are listed in Table 10-3. Table 10-8 lists waste soil and sediment hazardous waste levels for both the total and leachable portion of constituents from 22 CCR Division 4.5, Section 66261.

10.15.2.2 Background threshold values and beneficial use numerical limits for the SWMU 33 are listed in Table 7-1. Table 10-17 provides an identification of the ARARs, other factors that are involved in developing cleanup standards, and the cleanup standards themselves. The ARARs are the basis for the cleanup standards identified. These standards rely on the best practicable technology to protect background groundwater quality and beneficial uses in a way consistent with the chemical-specific performance standards of the Water Quality Goals established in Basin Plan for the Central Valley Region - Sacramento River and San Joaquin River Basins (Cal-EPA CVRWQCB, 1994).

10.15.3 Cost-effectiveness

Alternative 3 is considered cost-effective because contamination along the IWPL does not appear to be impacting groundwater at this time. The limited excavation, grouting, and institutional controls in Alternative 3 are estimated to cost $242,600 and will be effective in detecting any future groundwater concerns.

10.15.4 Utilization of Permanent Solutions, Alternative Treatment, and Resource Recovery

10.15.4.1 The selected remedy uses permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The selected remedy may not prevent soil contaminants from migrating to groundwater; however, the removal action addresses the most contaminated areas, and most of the area in question is paved. In addition, the selected remedy represents implementation of the best practicable technology, consistent with SWRCB Resolution No. 68-16. The groundwater monitoring program specifies beneficial use limits that cannot be exceeded without discussion in the Well Monitoring Program. The mobility, toxicity, and volume of the contaminants will be reduced through limited excavation. The selected remedy provides short-term effectiveness and is implementable. It is considered the most cost-effective of the alternatives. The cost-benefit analysis indicates that it is more cost-effective to rely on the OU 1 groundwater treatment system to address pesticides flushed from the vadose zone than to further excavate the contaminated soils. No cost-effective alternative treatment technologies or recovery techniques were identified for low levels of pesticide contamination.

10.15.4.2 The state and U.S. EPA have accepted the feasibility study and concur with the implementation of Alternative 2 as recommended in this ROD.

10.15.4.3 One public comment expressing concern over the high cost of excavation and potential exposure to excavated soil was received (refer to Responsiveness Summary for discussion).

10.15.5 Preference for Treatment as a Principal Element

The selected remedy relies on limited excavation, grouting, and institutional controls rather than treatment. Further treatment beyond that proposed in the selected remedy is not considered cost-effective. Further groundwater monitoring will be performed to assess the success of the selected remedy.

Table 10-1. Compliance With Location-Specific ARARS

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or Performance Standard (for NPL Sites)	Compliance
1.	Nat'l Historic Preservation Act (16 U.S.C. °461-467)	NA	No building or location at DDJC-Tracy has been considered for the National Registry of Historic Sites.	Not applicable.	NA
2.	Endangered Species Act	50 CFR 17	Several species on both the federal and state endangered or threatened species lists are found in the vicinity of DDJC-Tracy. Any remedial action taken at the site must not jeopardize these species.	Applicable. Applies to remedial actions taken at all DDJC-Tracy sites.	No known rare or endangered species have been observed at the depot. There is no reason to believe that planned remedial actions will jeopardize any endangered or threatened species.
3.	Executive Order 11988, Protection of Flood Plains	40 CFR 6, Section 6.302(b)	Relates to actions that will occur in a flood plain, i.e., lowlands and relatively flat areas adjoining inland and coastal waters and other flood-prone areas. Actions must be taken to avoid adverse effects, minimize potential harm, restore and preserve natural and beneficial values.	Not applicable. DDJC-Tracy does not lie within a floodplain area.	NA
4.	California Fish and Game Code	Division 6, Part 1, Chapter 6	This statute prohibits the deposition of any substance deleterious to fish, plant, or bird life where the substance can pass into the waters of the state. This code may apply to the Storm Drain Lagoon (SWMU 4).	Applicable. May apply to the Storm Drain Lagoon (SWMU 4).	No deleterious substances will be deposited in the Storm Drain Lagoon.

Table 10-2. Compliance With Action-Specific ARARs for OU 1 Groundwater Remediation

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
1	Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.).	California Water Code Section 13243. the discharge of waste, or certain	The RWQCB may specify certain conditions or areas where types of waste, is not permitted.	Applicable. Applies to groundwater remedial actions.	The location of the treated water discharge and waste discharge standards will be approved by the RWQCB before the discharge occurs.
2	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240,13241, 13242,13243).	Water Quality Control Plan (Basin Plan) for the RWQCB, Central Valley Region.	Establishes water quality objectives, including narrative and numerical standards, that protect the beneficial uses and water quality objectives of surface and ground waters in the region. Describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning.	Applicable. Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including but not limited to the discharge of contaminated soils or waters or in situ treatment or containment of contaminated soils or waters, must not result in actual water quality exceeding water quality objectives.	Beneficial uses were considered in establishing cleanup standards for groundwater contaminants. The most stringent federal or state objective was selected as the appropriate cleanup standard. The waste discharge standards developed for treated groundwater are protective of groundwater quality.
3	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000,13304, 13240,13241, 13242,13243).	RWQCB, Central Valley Region Basin Plan, "Policy for Investigation and Cleanup of Contaminated Sites."	Establishes and describes policy for investigating and remediating contaminated sites. Also includes implementation actions for setting groundwater and soil cleanup standards.	Applicable. Cleanup standards for OU 1 groundwater should be equal to background concentrations unless such standards are technically and economically infeasible to achieve. In such cases, cleanup standards should not exceed applicable water quality objectives.	Cleanup standards do not exceed the applicable water quality objectives. It has been demonstrated in the RI/FS that it is not economically feasible to reduce contaminant concentrations to background levels.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
4	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240,13241, 13242,13243).	RWQCB, Central Valley Region Basin Plan, "Policy for Application of Water Quality Objectives."	This policy defines water quality objectives and explains how the Regional Water Board applies the numerical and narrative water quality objectives to ensure the reasonable protection of beneficial uses of water and how the Regional Water Board applies Resolution No. 68-16 to promote the maintenance of existing high-quality waters.	Applicable. Applies to OU 1 groundwater remedial actions.	Water quality objectives were defined and are consistent with the referenced sections.
5	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240,13241, 13242,13243).	RWQCB, Central Valley Region Basin Plan, "Wastewater Reuse Policy."	Requires applicants for waste discharge requirements and discharge permits to evaluate land disposal as an alternative to discharge to surface waters.	Applicable. Applies to groundwater extracted by the OU 1 groundwater treatment system.	Reinjection of treated groundwater will be pursued as the primary disposal method. Treated groundwater that cannot be reinjected will be disposed to the percolation ponds.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
6	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13263,13304).	State Water Resources Control Board Resolution No. 68-16 ("Anti-degradation Policy").	Requires that high-quality surface and ground waters be maintained to the maximum extent possible. Degradation of waters is allowed (or allowed to remain) only if it is consistent with the maximum benefit to the people of the state, does not unreasonably affect present and anticipated beneficial uses, and does not result in water quality less than that prescribed in RWQCB and SWRCB policies. If degradation is allowed, the discharge must meet best practicable treatment or control, which must prevent pollution or nuisance and result in the highest water quality consistent with maximum benefit to the people of the state.	Applicable. Applies to discharges of waste to waters, including discharges to soil that may affect surface or ground waters. In situ cleanup standards for contaminated groundwater must be set at background level, unless allowing continued degradation is consistent with the maximum benefit to the people of the state. If degradation of waters is allowed or allowed to remain, the discharge must meet best practicable treatment or control standards, and result in the highest water quality possible that is consistent with the maximum benefit to the people of the state. In no case may water quality objectives be exceeded.	DDJC-Tracy will apply best practicable treatment or control method for ground water remediation. Water quality objectives will not be exceeded.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
7	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000,13140, 13240, 13260,13263, 13267,13300, 13304,13307).	State Water Resources Control Board Resolution No. 92-49 (as amended 21 April 1994).	Establishes requirements for investigation, cleanup, and abatement of discharges. Among other requirements, dischargers must clean up and abate the effects of discharges in a manner that promotes the attainment of either background water quality, or the best water quality that is reasonable if background water quality cannot be restored. Requires the application of Title 23, CCR, Section 2550.4 requirements to cleanups.	Applicable. Applies to groundwater remedial actions.	The groundwater cleanup system will be operated in such a way that the best water quality reasonable is restored. The requirements of Chapter 15 will be met.
8	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000,13140, 13240).	State Water Resources Control Board Resolution No. 88-63 ("Sources of Drinking Water Policy") (as contained in the RWQCB's Water Quality Control Plan).	Specifies that, with certain exceptions, all groundwaters and surface waters must have the beneficial use of municipal or domestic water supply.	Applicable. Applies in determining beneficial uses for waters that may be affected by discharges of waste.	Water use as municipal or domestic water supply used as a basis for determining beneficial use limits.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
9	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260,13263, 13267,13304).	Title 27, CCR, Division 2, Subdivision 1 (Section 20080 et seq.) Title 23, CCR, Division 3, Chapter 15 (Section 2510 et seq.	Establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Engineered alternatives that are Consistent with the Title 27/Title 23 performance goals may be considered. Establishes corrective action requirements for responding to discharges to land, including spills, leaks, and other unauthorized discharges.	The application of specific sections of Title 27/Title 23 is discussed below. Provisions of Title 23 apply to hazardous waste and provisions of Title 27 apply to designated and nonhazardous waste.	See specific requirements discussed below under Porter-Cologne Water Quality Control Act.
10	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172,13260,13263, 13267,13304).	Title 27,CCR, Section 20090(d), Title 23, CCR, Section 2511 (d). from immediate place of release and discharged to land must be managed in accordance with the classification (Title 27,CCR, ,Section 20200 /Title 23, CCR, section 2520) and siting requirements of Title 27 or Title 23 and wastes contained or left in place must comply with Title 27 or Title 23 to the extent feasible.	Actions taken by public agencies to cleanup unauthorized releases are exempt from Title 27/Title 23 accept that wastes removed	Applicable. Applies to remediation and monitoring of sites.	Ground water will be remediated and monitored according to Title 27/Title 23 regulations.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
11	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260,13263, 13267,13304).	Title 27, CCR, Section 20400, Title 23, CCR, Section 2550.4.	Cleanup standards must be set at background concentration levels, or, if background levels are not technologically and economically feasible, then at the lowest levels that are economically and technologically achievable. Specific factors must be considered in setting cleanup standards above background levels.	Relevant and Appropriate. a Applies in setting groundwater cleanup standards for all discharges of waste to land.	Attainment of background levels for dieldrin is not technologically or economically feasible. Cleanup standards above background levels will be evaluated every five years. If the actual concentration of a constituent is lower than its associated cleanup standard, the cleanup standard shall be lowered to reflect existing water quality.
12	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260,13263, 13267, 13304).	Title 27, CCR, Section 20410, Title 23, CCR, Section 2550.6	Requires monitoring for compliance with remedial action objectives for three years from the date of achieving cleanup standards.	Relevant and Appropriate. a Applies to OU 1 groundwater remedial actions.	Post-cleanup monitoring will be conducted in accordance with these provisions.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
13	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260,13263, 13267,13304).	Title 27, CCR, Section 20415, Title 23, CCR, Section 2550.7.	Requires general soil, surface water, and groundwater monitoring.	Relevant and Appropriate. a Applies to all areas at which waste has been discharged to land.	Monitoring will be conducted. accordance with the requirements of Title 27 Article 5/Title 23 Article 5 for all ground water at the facility subject to remediation. The agencies will be provided with quarterly and annual monitoring reports as part of the site-wide ground water Well Monitoring Program which covers assessment of ground water at the facility during the implementation of soil and ground water remedial actions.
14	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260,13263, 13267,13304).	Title 27, CCR, Section 20425, Title 23, CCR, Section 2550.9.	Requires an assessment of the nature and extent of the release, including a determination of the spatial distribution and concentration of each constituent.	Relevant and Appropriate. a Applies to areas at which monitoring results show statistically significant evidence of a release.	Further assessment of the nature and extent of releases to ground water is ongoing as part of implementing the ground water remedial actions .

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
15	Poeter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260,13263, 13267,13304).	Title 27, CCR, Section 20430, Title 23, CCR, Section 2550.10	Requires implementation of corrective action measures that ensure that cleanup standards are achieved throughout the zone affected by the release by removing the waste constituents or treating them in place. Source control may be required. Also requires monitoring to determine the effectiveness of the corrective actions.	Relevant and Appropriate. a Applies to groundwater remedial actions.	Corrective action measures will be implemented and the actions will be monitored to assess effectiveness.
16	California Safe Drinking Water Act (California Health & Safety Code Section 4010 et seq.).	Title 22, CCR, Section 64400 et seq.	Requirements for public water systems; includes Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs). SDWA standards for this cleanup action are 6 Ig/L for DCE. Standards for TCE and PCE are established by the Federal Safe Drinking Water Act.	Relevant and appropriate. The act is legally applicable for an aquifer and associated distribution and pre-treatment system that is currently defined as a "public water system." If it is only a potential "public water system," then the act is relevant and appropriate.	See Section 10-3 for a list of cleanup goals for the OU 1 remedial action. Concentrations protective of beneficial uses have been established that are consistent with the referenced action levels.
17	Staff Report of the RWQCB, Central Valley Region.	"A Compilation of Water Quality Goals."	Provides guidance on selecting numerical values to implement narrative water quality objectives contained in the Basin Plan.	Performance Standard. To be considered in selecting appropriate numerical values to implement the Basin Plan for setting cleanup standards and discharge limits. The numerical values contained in the staff report may be ARARs or Performance Standards, depending on the source of the values.	Cleanup standards were developed consistent with the specified methodology.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
18	Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA) 42 USC 6901 et seq. California Hazardous Waste Control Act (HWCA) California Health and Safety Code 25100 et seq.	22CCR 66264	RCRA outlines the requirements for the transportation, storage, and disposal of defined hazardous wastes. Some of the wastes handled during any remedial action at DDJC-Tracy may be hazardous wastes.	Applicable. Applies to hazardous waste management. The specific requirements that may be applicable depend on the wastes handled and the technologies identified in the RI/FS process.	All wastes (i.e., spent GAC) generated by the OU 1 groundwater treatment system will be handled in accordance with the substantive requirements of RCRA.
19	Health and Safety Standards for Management of Hazardous Waste	CCR, Title 22, Division 4.5, Chapter 14, Article 16, Sections 66264.600-66264.603	Applies to owners and operators of facilities that treat, store, or dispose of RCRA hazardous waste in miscellaneous units. Covers environmental performance standard, monitoring, inspections, and post-closure care.	Relevant and Appropriate.	The selected remedy will utilize air stripper units which are considered miscellaneous units. CA Regulatory Agency: DTSC
20	Health and Safety Standards for Management of Hazardous Waste	CCR, Title 22, Division 4.5, Chapter 14, Article 9, Sections 66264.170 - 66264.178.	Applies to owners and operators who store hazardous waste more than 90 days in containers. Covers use and management of containers, containment, inspections, and closure.	Relevant and Appropriate	The spent granular activated carbon units are the only anticipated hazardous waste to be generated by the selected remedy. These units are considered to be containers. Because these units may be stored for more than 90 days, this regulation applies. CA Regulatory Agency: DTSC

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
21	Hazardous Waste Control Act (California Health and Safety Code 25100 et seq.).	27 CCR, Division 2, Subdivision 1.	Title 27 establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Title 27 also contains corrective action provisions for responding to leaks and other unauthorized discharges.	Applicable. Applies to discharges of waste to land for treatment storage and disposal.	Spent GAC and other wastes will be classified and handled in accordance with Title 27 requirements.
22	Air Resources Act H &S Code, Div. 26, Sec. 39000.	CCR, Title 17, Part III, Chapter 1, Sec. 60000 and San Joaquin Valley Unified Air Pollution Control District Rules and Regulations, Rules 4651 and 2201.	Regulates nonvehicular sources of air contaminants in California. The local Air Pollution Control District (APCD) sets allowable emissions limits. Regulations for the release of organic solvents from an air stripper are specified in Rule 4651, Volatile Organic Compound (VOC) Emissions from Decontamination Of Soil, and Rule 2201, New and Modified Stationary Source Rule. San Joaquin Valley Unified APCD performs a screening health risk assessment for soil or groundwater cleanup projects based on the CAPCOA Risk Assessment Guideline as a matter of policy. Maximum allowable cancer risk is 10 in 1 million. Public notification is required if the site is within 1,000 feet of a K-12 school.	Applicable. Applies to soil decontamination processes and could reasonably apply to this groundwater remediation system and associated air emissions. BACT is required if the emissions exceed two pounds per day of a regulated air contaminant. For this type of process, a control effectiveness of 95% is considered BACT.	Air emissions standards for the air stripper system will be specified by SJVUAPCD.

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
23	San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rules and Regulations, Regulation VIII	SJVUAPCD Regulation VIII, Rules 8010, 8020, and 8060.	Prohibitory rules regulate fugitive dust and PM10 emissions that occur during demolition, construction, and vehicle travel on paved and unpaved roads. Requires the use of dust suppression measures during all site preparation and vehicle travel.	Applicable. Applies to construction and site preparation activities as well as the PM 10 emissions due to ground disturbances during the installation of the groundwater remediation system.	Construction and site preparation activities will include dust suppression and PM10 emission control measures. At a minimum, water will be used to minimize the emission of fine particulate dust to less than the visible dust emission requirement specified in Rule 8010.
24	San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rules and Regulations, Regulation IV	SJVUAPCD Regulation IV, Rule 4102.	Prohibits the emission of any regulated air pollutants in such quantities that tile source causes injury, detriment, or nuisance to the public.	Applicable. Applies to the operation of the groundwater remediation system emissions which could feasibly create a nuisance due to TCE/PCE odors and PM10 emissions from ground disturbances during the installation of the groundwater remediation system.	The groundwater remediation system will be operated in a manner that eliminates or substantially reduces the potential to create a nuisance.
25	42 USC Section 300 el Seq.	40 CFR 144 et seq. ment of fluids through an injection well. There are five classes of wells regulated.	Regulates subsurface emplace- groundwater infiltration galleries, which are classed as Type V wells.	Applicable. Applies to groundwater infiltration these regulatory provisions.	Infiltration galleries will be operated in accordance with

Table 10-2. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard Applicability	Compliance
26	Resource Conservation and Recovery Act Subpart AA (22 CCR 66265.1030 et seq.).	Article 27 Air Emission Standards for Process Vents (22 CCR 66265.1030 - 66265.1035).	Applies to treatment, storage, and disposal facilities with process vents associated with solvent extraction or air or steam stripping operations managing RCRA hazardous wastes with organic concentrations of at least 10 ppmw. These operations must reduce total organic emissions below specified concentrations or use a control device to reduce total organic emissions by 95 percent by weight.	Relevant and appropriate. Requirements are not applicable because contaminant concentrations do not exceed RCRA hazardous waste levels. However, the requirements are relevant and appropriate for groundwater extraction and air-stripping operations.	The remedial action will be managed to ensure that total organic emissions are controlled below specified emission levels.
27	National Emission Standards for Hazardous Air Pollutants (40 CFR 63.920 er seq.).	Subpart PP-National Emission Standards for Containers (40 CFR 63.922 et seq.).	Applies to owners and operators of containers who are subject to 40 CFR parts 60, 61, or 63. Containers must, among other things, be equipped with a cover and closure devices that form a continuous barrier over container openings. Any open-top containers must ensure that no materials are exposed to the atmosphere.	Relevant and appropriate. Containers storing hazardous materials and wastes will be in place to support all remedial options.	All containers will be managed so as to avoid the release of volatile hazardous air pollutants. Containers will be properly equipped and will only be open during loading and unloading events.

Table 10-2. Compliance With Action-Specific ARARs for OU 1 Groundwater Remediation

EPA's legal position is that Title 23 CCR, division 3, chapter 15 and Title 27 CCR, division 2, subdivision 1 are ARARs only as invoked by 23 CCR 2511(d) and 27 CCR 20090(d), respectively. The RWQCB disagrees with this and reserves the legal position that these requirements are applicable.

APCD	=	Air Pollution Control District
ARAR	=	Applicable or Relevant and Appropriate Requirement
CAA	=	Clean Air Act
CCR	=	California Code of Regulations
CERCLA	=	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	=	Code of Federal Regulations
DCE	=	dichloroethene
GAC	=	Granular Activated Carbon
HWCA	=	Hazardous Waste Control Act
MCL	=	maximum contaminant level
NA	=	not applicable
NAAQS	=	National Ambient Air Quality Standards
NESHAP	=	National Emission Standards for Hazardous Air Pollutants
NSPS	=	New Source Performance Standards
OU	=	Operable Unit
PCE	=	tetrachloroethene
POTW	=	Publicly Owned Treatment Works
RCRA	=	Resource Conservation and Recovery Act
RI/FS	=	Remedial Investigation/Feasibility Study
RWQCB	=	Regional Water Quality Control Board
SJVUAPCD	=	San Joaquin Valley Unified Air Pollution Control District
SMCL	=	Secondary Maximum Contaminant Level
SWMU	=	Solid Waste Management Unit
SWRCB	=	State Water Resources Control Board
TCE	=	trichloroethene
VOC	=	volatile organic compound

Table 10-3. Compliance With Action-Specific ARARs for Soil Remediation

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
1	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13304, 13240, 13241, 13242, 13243).	RWQCB, Central Valley Region, Water Quality Control Plan (Basin Plan), "Policy for Investigation and Cleanup of Contaminated Sites."	Establishes and describes the policy for the investigation and remediation of contaminated sites. Also includes implementation actions for setting groundwater and soil cleanup levels.	Applicable. Cleanup levels for soils should be equal to levels that would achieve background concentrations in ground water unless such levels are technically and economically infeasible to achieve. In such cases, soil cleanup levels are such that groundwater will not exceed applicable groundwater quality objectives.	All sites.	Soil cleanup standards were established to comply with this requirement
2	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243).	RWQCB, Central Valley Region Basin Plan, "Policy for Application of Water Quality Objectives"	This policy defines water quality objectives and explains how the Regional Water Board applies numerical and narrative water quality objectives to ensure the reasonable protection of beneficial uses of water and how the Regional Water Board applies Resolution No. 68-16 to promote the maintenance of existing high-quality waters.	Applicable. Applies to all cleanups of discharges that may affect water quality.	All sites.	Soil cleanup standards were established to comply with this requirement

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
3	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243).	RWQCB, Central Valley Region Basin Plan.	Establishes water quality objectives, including narrative and numerical standards, that protect the beneficial uses of surface and groundwaters in the region. Describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. Also includes implementation actions for setting soil cleanup levels for soils that threaten water quality.	Applicable. Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including for example a new discharge of contaminated soils or in situ treatment or containment of contaminated soils, that may affect water quality must not result in water quality exceeding water quality objectives. Implementation plans and other policies and requirements may also apply.	All sites.	Soil cleanup standards were established to comply with this requirement

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
4	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13263, 13304).	State Water Resources Control Board Resolution No. 68-16, "Antidegradation Policy".	Requires that high-quality surface and groundwaters be maintained to the maximum extent possible. Degradation of waters will be allowed (or allowed to remain) only if it is consistent with the maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than that prescribed in RWQCB and SWRCB policies. If degradation is allowed, the discharge must meet best practicable treatment or control, which must prevent pollution or nuisance and result in the highest water quality consistent with maximum benefit to the people of the state.	Applicable. Applies to discharges of waste to waters, including discharges to soil that may affect surface or groundwaters. In situ cleanup levels for contaminated soils must be set so that ground waters are not degraded, unless degradation is consistent with the maximum benefit of the people of the state. If degradation is allowed, the discharge must meet best practicable treatment or control and result in the highest water quality possible that is consistent with tile maximum benefit to the people of the state. In no case may water quality objectives be exceeded.	All sites.	Soil cleanup standards were established to comply with this requirement

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
5	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240, 13260, 13263, 13267, 13300, 13304, 13307).	State Water Resources Control Board Resolution No. 92-49 (as amended 21 April 1994).	Establishes requirements for the investigation, cleanup, and abatement of discharges. Among other requirements, dischargers must clean up and abate the effects of discharges in a manner that promotes the attainment of either background water quality or the best water quality that is reasonable if background water quality cannot be restored. Requires the application of Title 23, CCR, Division 3, Chapter 15 requirements to cleanups.	Applicable. Applies to all cleanups of discharges that may affect water quality.	All sites.	Soil cleanup standards were established to comply with this requirement
6	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240).	State Water Resources Control Board Resolution No. 88-63 ("Sources of Drinking Water Policy") (as contained in the RWQCB's Basin Plan).	Specifics that, with certain exceptions, all ground and surface waters have the beneficial use of municipal or domestic water supply.	Applicable. Applies in determining beneficial uses for waters that may be affected by dischargers of waste.	All sites.	Cleanup standards to maintain beneficial uses were developed in a way consistent with the requirements for municipal or domestic water supply. Consequently, California state primary MCLs are relevant and appropriate; however, the most stringent federal or state standard was used to determine the beneficial use limit. California standards may be found in 22 CCR 66439 et seq.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
7	Staff Report of the RWQCB, Central Valley Region.	The Designated Level Methodology for Waste Classification and Cleanup Level Determination.	Provides guidance on how to classify wastes according to Title 27, CCR, Division 2, Subdivision 1/Title 23, CCR, Division 3, Chapter 15, Article 10.	Performance Standard. To be considered in determining the classification of wastes and contaminated soils.	Excavation - SWMUs 2,3,4,6,8,20,27,33	This methodology will be used when classifying excavation wastes. Designated wastes will only be discharged to an off-site Class I or Class II facility.
8	Staff Report of the RWQCB, Central Valley Region.	"A Compilation of Water Quality Goals."	Provides guidance on selecting numerical values to implement the narrative water quality objectives contained in the Basin Plan.	Performance Standard. To be considered in selecting appropriate numerical values to implement the Basin Plan for setting cleanup levels and discharge limits. The numerical values contained in the staff report may be applicable, relevant, and appropriate or to be considered, depending on the source of the values.	All sites.	This guidance was considered as one of the criteria for setting beneficial uses and, consequently, setting soil cleanup levels.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
9	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27, CCR, Division 2, Subdivision 1 (Section 20080 et seq.), Title 23, CCR, Division 3, Chapter 15 (Section 2510 et	Establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Engineered alternatives that are consistent with the Title 27/Title 23 performance goals may be considered. Establishes corrective action requirements for responding to leaks and other unauthorized discharges.	The application of specific sections of Title 27/Title 23 to different situations is discussed below. Provisions of Title 23 apply to hazardous waste and provisions of Title 27 apply to designated and nonhazardous solid waste.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Excavated soil will be classified appropriately and deposited in a disposal facility that maintains compliance with this provision. Waste management procedures consistent with Title 27/Title 23 will be utilized in soil handling and managing stockpiled soils.
10	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172,13260,13263,13267,13304).	Title 27,CCR, Section 20090(d), Title 23, CCR, Section 2511(d). Title 27/Title 23 seq.)	Actions taken by public agencies to cleanup unauthorized releases are exempt from Title 27/Title 23 accept that wastes removed from immediate place of release and discharged to land must be managed in accordance with the classification (Title 27,CCR ,Section 20200/Title 23,CCR, Section 2520) and siting requirements of Title 27 or Title 23 and wastes contained or left in place must comply with Title 27 or Title 23 to the extent feasible.	Applicable, Applies to remediation and monitoring of sites.	Applies to all sites subject to remediation.	Ground water will be monitored and soil sites will be remediated and closed according to regulations.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
11	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 1330-4).	Title 27, CCR, Section 20080(d) Title 23, CCR, Section 2510(d).	Requires closure of existing waste management units in accordance with the requirements of Title 27 Article 8/Title 23 Article 8.	Applicable. Applies to "existing" waste management units (i.e., areas where waste was discharged to land on or before 27 November 1984, but that were not closed, abandoned, or inactive prior to that date).	Applies to all sites subject to remediation.	The OU 1 groundwater and the SWMUs that are suspected sources of contamination will be closed in accordance with the requirements of Title 27 Article 8/Title 23 Article 8. These requirements include closure in accordance with an approved closure and post-closure maintenance plan that provides for continued compliance with the applicable Title 27 standards for waste containment, precipitation and drainage control, and monitoring.
12	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27,CCR, Section 20080(g), Title 23,CCR, Section 25	Requires monitoring. If water quality is threatened, corrective action consistent with Title 27, Article 5/Title 23 is required	Relevant and Appropriate. a Applies to areas of land where discharges have ceased as of 27 November 1984 (the effective date in the revised Title 27/Title 23 regulations).	Applies to all sites where water quality is threatened. (All sites except for the North Depot surface soils.)	The monitoring program at these sites will be implemented in accordance with Title 27/Title 23.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
13	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13269).	Title 27, CCR, Section 20400, Title 23, CCR, Section 2550.4.	Cleanup levels must be set at background concentration levels or, if background levels are not technologically and economically feasible, at the lowest levels that are economically and technologically feasible. Specific factors must be considered in setting cleanup levels above background levels. Cleanup levels above background levels shall be evaluated every five years. If the actual concentration of a constituent is lower than its associated cleanup level, the cleanup level shall be lowered to reflect existing water quality.	Relevant and Appropriate. a If water quality is threatened, this section applies in setting soil cleanup levels for all cleanups of discharges of waste to land.	All sites.	Sites where wastes will be left in place will be managed and monitored in accordance with the requirements of Title 27/Title 23.
14	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172,13260, 13263,13267, 13269).	Title 27, CCR, Section 20410, Title 23, CCR Section 2250.6	Requires monitoring for compliance with remedial action objectives for three years from the date of achieving cleanup levels.	Relevant and Appropriate. a Applies to all soil cleanup activities.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Institutional Controls - SWMUs 7,11,33 Bioventing - SWMU 24	Sites will be monitored for at least three years after cleanup standards have been achieved.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
15	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 27, CCR, Section 20415, Title 23, CCR, Section 2550.7.	Requires general soil, surface water, and groundwater monitoring.	Relevant and Appropriate. a Applies to all areas in which waste has been discharged to land.	SVE - Group A Sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Institutional Controls - SWMUs 7,11,33 Bioventing - SWMU 24 Natural Attenuation - SWMU 20 Asphalt Cover - N.Depot surf. soils	Monitoring will be conducted in accordance with the requirements of Title 27 Article 5/Title 23 Article 5 for all ground water at the facility subject to remediation. The agencies will be provided with quarterly and annual monitoring reports as part of the site-wide ground water Well Monitoring Program which covers assessment of ground water at the facility during the implementation of soil and ground water remedial actions.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
16	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 27, CCR, Section 20425, Title 23, CCR, Section 2550.9.	Requires an assessment of the nature and extent of the release, including a determination of the spatial distribution and concentration of each constituent.	Relevant and Appropriate. a Applies to sites at which monitoring results show statistically significant evidence of a release	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Institutional Controls - SWMUs 7,11,33 Bioventing - SWMU 24 Natural Attenuation - SWMU 20 Asphalt Cover - N. Depot surf. soils	Further assessment of the nature and extent of releases will continue during implementation of the RD/RA.
17	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 27, CCR, Section 20430, Title 23, CCR, Section 2550.10	Requires the implementation of corrective action measures that ensure that cleanup levels are achieved throughout the zone affected by the release by either removing the waste constituents or treating them in place. Source control may be required. Also requires monitoring to determine the effectiveness of the corrective actions.	Relevant and Appropriate. a If water quality is threatened, this section applies to all soil cleanup activities.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Institutional Controls - SWMUs 7,11,33 Bioventing - SWMU 24 Natural Attenuation - SWMU 20 Asphalt Cover - N. Depot surf. soils	Corrective action measures and monitoring will be undertaken as prescribed. To demonstrate cleanup, the concentration of each COC in groundwater must be equal to or less than the cleanup standard for at least one year following the corrective action; otherwise, the remedy will be reevaluated.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
18	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 27, CCR, Section 20950; 22207(a); 22212(a), and 22222, Title 23, CCR Sections 2550.0(b); 2580; 2580(f);	General closure requirements, including continued maintenance of waste containment, drainage controls, and groundwater monitoring throughout the closure and post-closure maintenance periods.	Applicable. Applies to partial or final closure of waste management units.	SVE - Group A sites, SWMU 20 Excavation - SWMUS 2,3,4,6,8,20,27,33 Institutional Controls - SWMUs 7,11,33 Bioventing - SWMU 24 Natural Attenuation - SWMU 20	Monitoring and maintenance of waste management units will be conducted during closure and post-closure periods for as long as wastes pose a threat to water quality.
19	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13269).	Title 27, CCR, Section 21400, Title 23, CCR, Section 2582.	Requires surface impoundments to be closed by removing and treating all free liquid and either removing all remaining contamination or closing the surface impoundment as a landfill.	Applicable. If water quality is threatened, this section is relevant and appropriate for natural topographic depressions, excavations, and diked areas where wastes containing free liquids were discharged.	Excavation - SWMUs 2,3,4	Clean closure will be attempted. Cleanup standards identified in this ROD are expected to protect water and attain clean closure. Clean closure will be verified with ground water monitoring.
20	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13269).	Title 27, CCR, Section 20080(d) Title 23, CCR, Section 2510(d)	Requires closure of existing waste management units according to Title 27, Article 8/Title 23 Article 8.	Applicable. Applies to all areas where waste has been discharged to land.	All sites.	All SWMUs and soil contamination areas will be closed according to Title 27 closure requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
21	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172,13260, 13263,13269).	Title 23, CCR, Section),2520 2521,	Requires that hazardous waste be discharged to Class I waste management units that meet certain design and monitoring standards.	Applicable. Applies to discharges of hazardous waste to land for treatment, storage, or disposal.	Excavation - SWMUs 2,3,4,6,8,20, 27,33	Hazardous wastes will be discharged to Class I waste management units. Excavated hazardous wastes will be properly manifested and disposed of off site at a permitted Class I hazardous waste treatment storage or disposal facility.
22	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172,13260, 13263,13269).	Title 27, CCR, Section 20200(c),20210.	Requires that designated waste be discharged to Class I or Class II waste management units.	Applicable. Applies to discharges of designated waste (nonhazardous waste that could cause degradation of surface or groundwaters) to land for treatment, storage, or disposal.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Designated wastes will be discharged off site to permitted Class I or Class II waste management units.
23	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172,13260, 13263,13269).	Title 27, CCR, Section 20200(c),20220.	Requires that nonhazardous solid waste be discharged to a classified waste management unit.	Applicable. Applies to discharges of nonhazardous solid waste to land for treatment, storage, or disposal.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Nonhazardous solid wastes will be discharged to classified waste management units.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
24	CWA, Section 402, Porter-Cologne Water Quality Control Act (California Water Code Sections 13260,13263, 133703.5,13372, 13373,13374, 13375,13376, 13377,13383).	40 CFR Parts 122,123,124, National Pollution Discharge Elimination System, implemented by State Water Resources Control Board Order No. 92-08 DWQ	Regulates pollutants in discharge of storm water associated with construction activity (clearing, grading, or excavation) involving the disturbance of 5 acres or more. Requirements to ensure storm water discharges do not contribute to a violation of surface water quality standards	Applicable. Applies to construction areas over 5 acres in size. Includes measures to minimize and/or eliminate pollutants in storm water discharges and monitoring to demonstrate compliance.	Excavation - SWMUs 2,3,4	Storm water best management practices (BMPs) will be used to prevent adverse effects to surface water. Excavations will be conducted during dry season. A Storm Water Pollution Prevention Plan will be submitted to the RWQCB under the storm water compliance program.
25	CWA, Section 402, Porter-Cologne Water Quality Control Act (California Water Code Sections 13260,13263, 13370.5,13372, 13373,13374 13375,13376 13377,13383).	40 CFR Parts 122,123,124, National Pollution Discharge Elimination System, implemented by California General Stormwater Permit for Industrial Activities, State Water Resources Control Board Order #97-03-DWQ.	Regulates pollutants in discharge of storm water associated with hazardous waste treatment, storage, and disposal facilities, wastewater treatment plants, landfills, land application sites, and open dumps. Requirements to ensure storm water discharges do not contribute to a violation of surface water quality standards.	Applicable. Applies to storm water discharges from industrial areas. Includes measures to minimize and/or eliminate pollutants in storm water discharges and monitoring to demonstrate compliance.	SVE - Group A Sites, SWMU 20 Bioventing - SWMU 24	All treatment activities will comply with the substantive portions of the permit, including implementation of best management practices. A Storm Water Pollution Prevention Plan will be submitted to the RWQCB under the storm water compliance program.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
26	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 12 (Standards Applicable to Generators of Hazardous Waste), Article 1 (Applicability) 22 CCR 66262.11	Establishes standards for generators of hazardous waste. Applicable for determining if the wastes from excavated sites or treatment processes are classified as hazardous or non-RCRA hazardous waste, and the remedial action constitutes treatment, storage, or disposal of hazardous waste.	Applicable. Applies to hazardous waste management. The specific requirements that may be applicable will depend on the wastes handled and the technologies identified in the RI/FS process.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
27	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 14 (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities), Article 9 (Use and Management of Containers) 22 CCR 66264.171 - 66264.178	The chemicals recovered from the sediments, surface soils, subsurface soils, or groundwater may need to be managed as either a RCRA or non-RCRA hazardous waste. The treatment, storage, and disposal requirements for these wastes are either applicable or relevant and appropriate (depending upon the classification of the waste material) and they include; using containers to store the recovered product that are compatible with this material (22 CCR 66264.172); using containers that are in good condition (22 CCR 66264.171); segregating (the waste from incompatible wastes (12 CCR 66264.177); inspect the containers (22 CCR 66264.174); isolating the waste from sources of ignition (if the material is ignitable) and (22 CCR 66264.176); providing adequate secondary containment for the waste stored (22 CCR 66264.175); containers must be closed during transfer (22 CCR 66264,173); and all hazardous material must be removed at closure (22 CCR 66264.178).	Applicable if during excavation, treatment processes, or cleanup activities hazardous waste is identified through the proper characterization process, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
28	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 14 (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities), Article 12 (Waste Piles) 22 CCR 66264.251, 66264.254, 66264.256-66264.259	Delineates requirements for the management of waste piles for hazardous wastes. This regulation is applicable to sites where excavated materials are classified as hazardous wastes and managed in waste piles. The titles of the regulations are Section 66264.251. Design and Operating Requirements; Section 66264.254. Monitoring and Inspection; Section 66264.256. Special Requirements for Ignitable or Reactive Waste; Section 66264.257. Special Requirements for Incompatible Wastes; Section 66264.258. Closure and Post-Closure Care; and Section 66264.259. Special Requirements for Hazardous Wastes P020, P021, P022, P023, P026, and P027.	If during excavation, treatment processes, or cleanup activities, hazardous waste is identified through the proper characterization process, and will be managed in waste piles, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
29	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 14 (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities), Article 19 (Corrective Action for Waste Management Units) 22 CCR 6624.552, 66264.553	CAMU: Placement, consolidation, and treatment of soils and wastes being generated as part of a corrective action under RCRA will not be considered a new disposal to land as long as the materials are handled in designated CAMUs. Land disposal restrictions (22 CCR 66268) are not invoked when remediation wastes are managed in a CAMU. A CAMU can only be used for the management of remediation wastes pursuant to implementing corrective actions at the facility. USEPA intended that the federal CAMU rule be considered for the management of wastes generated at CERCLA sites. Excavation of wastes from the discharge and disposal sites might be managed at a CAMU for on-base disposal, or ex situ bioremediation.	If during excavation, treatment processes, or cleanup activities hazardous waste is identified through the proper characterization process, and will be managed in waste piles, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
29 (Continued)			A CAMU is an area within a facility for the purpose of implementing corrective actions. Uncontaminated areas are allowed to be designated as part of a CAMU when they are necessary to achieve the overall goals for the facility and will enhance the protectiveness of the remedial action. The CAMU rule allows consolidation and treatment of wastes in a single unit, from other areas of the facility, without triggering minimum technology requirements and LDR found in other provisions of RCRA and HWCL; that is, placement of wastes into a CAMU is not considered land disposal and redeposition of treated wastes into the CAMU does not trigger the LDRs. Groundwater must be monitored at the CAMU in order to detect and characterize a release.			

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
30	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 18 (Land Disposal Restrictions), Article I (General) 22 CCR 66268.3, 66268.7(a) & (b), 66268.9	Provides (the purpose, scope, and applicability of LDRs. The title of the sections of the regulations are; Section 66268.3, Dilution Prohibited As a Substitute for Treatment; Section 66268.7, Waste Analysis and Record Keeping; and Section 66268.9, Special Rules Regarding Wastes That Exhibit a Characteristic.	If during excavation, treatment processes, or cleanup activities hazardous waste is identified through the proper characterization process, and will be managed in waste piles, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation. Only applicable if hazardous wastes are disposed of or treated in an area not designated as a CAMU or disposed of or treated beyond the area of contamination.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.
31	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 18 (Land Disposal Restrictions), Article 3 (Prohibitions on Land Disposal) 22 CCR 66268.30-66268.35	These standards are applicable to sites where excavated material is classified as hazardous waste and is disposed of or treated in an area not designated as a CAMU. Provides waste-specific LDRs for Section 66268.30, Waste Specific Prohibitions-Solvent	If during excavation, treatment processes, or cleanup activities hazardous waste is identified through the proper characterization process, and will be managed in waste piles, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
31	(Continued)		Wastes; Section 66268.31, Waste Specific Prohibitions-Dioxin-Containing Wastes; Section 66268.32, Waste Specific Prohibitions-California List Wastes; Section 66268.33, Waste Specific Prohibitions-First Third Wastes; Section 66268.34. Waste Specific Prohibitions-Second Third Waste; and Section 66268.35, Waste Specific Prohibitions-Third Third Waste.			
32	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 18 (Land Disposal Restrictions), Article 4 66268.41. (Treatment Standards) 22 CCR 66268.41 - 66268.43	These standards are applicable to sites where excavated materials are classified as hazardous waste and are disposed of or treated in an area not designated as a CAMU. Provides treatment standards expressed in contaminant concentrations in Section Treatment Standards Expressed As Concentrations in Waste	If during excavation, treatment processes, or cleanup activities hazardous waste is identified through the proper characterization process, and will be managed in waste piles, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
32	(Continued)		Extract; Section 66268.42. Treatment Standards Expressed As Specified Technologies; and Section 66268.43. Treatment Standards Expressed As Waste Concentrations. These standards provide waste specific LDRs for solvent wastes, dioxin-containing wastes, and California Listed Wastes.			
33	California Hazardous Waste Control Law	Title 22, Division 4.5 (Environmental Health Standards for Management of Hazardous Waste), Chapter 18 (Land Disposal Restrictions), Article 5 (Prohibitions on Storage) 22 CCR 66268.50	This standard is applicable to sites where excavated material is classified as hazardous waste. The standard provides prohibitions on storage of restricted wastes.	If during excavation, treatment processes, or cleanup activities hazardous waste is identified through the proper characterization process, and will be managed in waste piles, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.	Excavation - SWMUs 2,3,4,6,8,20,27,33	Hazardous wastes will be stored, transported, and disposed in accordance with HWCA requirements.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
34	San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rules and Regulations, Regulation VIII.	SJVUAPCD Regulation VIII Rules 8010, 8020, and 8060.	Prohibitory rules regulate fugitive dust and PM 10 emissions that occur during demolition, construction, and vehicle travel on paved and unpaved roads. Requires the use of dust suppression measures during all site preparation and Vehicle travel.	Applicable. Applies to construction and site preparation activities as well as the PM10 emissions due to ground disturbances during the installation of the SVE, bioventing, and excavation activities.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Bioventing - SWMU 24	Construction and site preparation activities will include dust suppression and PM10 emission control measures. At a minimum, water will be used to minimize the emission of fine particulate dust to less than the visible dust emission requirement specified in Rule 8010.
35	San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rules and Regulations, Regulation IV.	SJVUAPCD Regulation IV Rule 4102.	Prohibits the emission of any regulated air pollutants in such quantities that the source causes injury, detriment, or nuisance to the public.	Applicable. Applies to the use and operation of the remediation systems and the associated emissions that could feasibly create a nuisance due to odors.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Bioventing - SWMU 24	The SVE and bioventing systems will be operated in a manner that eliminates or substantially reduces the potential to create a nuisance.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
36	Air Resources Act H&S Code, Div. 26, Sec. 39000.	CCR, Title 17, Part III, Chapter 1, Sec. 60000 and San Joaquin Valley Unified Air Pollution Control District Rules and Regulations, Rules 4651.	Regulates nonvehicular sources of air contaminants in California. The local Air Pollution Control District sets allowable emissions limits. Regulations for release of organic solvents from an air stripper are specified in Rule 4651 Volatile Organic Compound (VOC) Emissions from Decontamination of Soil.	Applicable. Applies to soil decontamination processes and remediation systems and their associated air emissions. BACT is required if the emissions exceed 2 pounds per day of a regulated air contaminant. For this type of process, a control effectiveness of 95% is considered BACT.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Bioventing - SWMU 24	SVE, excavation, and bioventing systems will be operated in a manner that complies with the requirements in SJVUAPCD Rule 4651.
37	Air Resources Act H&S Code, Div. 26, Sec.39000.	CCR, Title 17, Part III, Chapter 1, Sec. 60000 and San Joaquin Valley Unified Air Pollution Control District Rules and Regulations, Rules 2201.	New and Modified Stationary Source Rule. SJVUAPCD performs a screening health risk assessment for soil or groundwater cleanup projects based on the CAPCOA Risk Assessment Guideline as a matter of policy. Maximum allowable cancer risk is 10 in 1 million. Public notification is required if site is within 1,000 feet of a K - 12 school.	Applicable. Applies to soil decontamination processes and remediation systems and their associated air emissions. BACT is required if the emissions exceed 2 pounds per day of a regulated air contaminant. For this type of process, a control effectiveness of 95% is considered BACT.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20,27,33 Bioventing - SWMU 24	SVE, excavation, and bioventing systems will be operated in a manner that complies with the requirements in SJVUAPCD Rule 4651.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
38	Clean Air Act (CAA) (42 USC °7401-7642).	National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61), Subparts A, E, F, J, V, and FF, and SMAQMD Rule 4002.	Section 112 of the CAA establishes national emission standards for hazardous air pollutants (NESHAPs). The standards address new and existing sources, and are oriented toward particular hazardous pollutants at their point of emission from specific sources.	Applicable. Applies to air emissions at DDJC-Tracy associated with soil remediation technologies.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8,20, 27,33 Bioventing - SWMU 24	Hazardous air pollutant standards will be met at the points of emission.
39	National Emission Standards for Hazardous Air Pollutants (40 CFR 63.920 et seq.).	Subpart PP--National Emission Standards for Containers (40 CFR 63.922 et seq.).	Applies to owners and operators of containers who are subject to 40 CFR parts 60, 61, or 63. Containers must, among other things, be equipped with a cover and closure devices that form a continuous barrier over container openings. Any open-top containers must ensure that no materials are exposed to the	Relevant and appropriate. Containers storing hazardous materials and wastes will be in place to support all remedial options.	SVE - Group A sites, SWMU 20 Excavation - SWMUs 2,3,4,6,8, 20,27,33	All containers will be managed so as to avoid the release of volatile hazardous air pollutants. Containers will be properly equipped and will only be open during loading and unloading events.

Table 10-3. (Continued)

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARAR or Performance Standard (Applicability)	Actions and Sites Affected	Compliance
40	National Emission Standards for Hazardous Air Pollutants (40 CFR 63.680 et seq.).	Subpart DD-National Emission Standards from Off-site Waste and Recovery Operations (40 CFR 63.680 et seq.).	Applies to owners and operators of off-site treatment, storage, and disposal facilities, wastewater treatment operations, or hazardous waste recycling facilities that are major sources of hazardous air pollutants. Requires any of the following: (1) the installation of air emission controls; (2) the pretreatment of the hazardous air pollutant before entering management units; or (3) ensuring that volatile hazardous air pollutant concentrations remain below 500 ppmw.	Relevant and appropriate.	SVE - Group A sites, SWMU 20 Bioventing - SWMU 24 Excavation - SWMUs 2,3,4,6,8,20,27,33	The volumes and concentrations of volatile hazardous air pollutants are expected to fall below specified action levels. In the event higher concentrations are observed, appropriate control devices will be installed.

Table 10-3. (Continued)

a EPA's legal position is that Title 23 CCR, division 3, chapter 15 and Title 27 CCR, division 2, subdivision 1 are ARARs only as invoked by 23 CCR 2511(d) and 27 CCR 20090(d), respectively. The RWQCB disagrees with this and reserves the legal position that these requirements are applicable.

APCD	=	Air Pollution Control District
ARAR	=	Applicable or Relevant and Appropriate Requirement
BMPS	=	Best Management Practices
CAA	=	Clean Air Act
CAMU	=	Corrective Action Management Unit
CAPCOA	=	California Air Pollution Control Officer Association
CCR	=	California Code of Regulations
CERCLA	=	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	=	Code of Federal Regulations
DCE	=	dichloroethene
GAC	=	Granular Activated Carbon
HWCA	=	Hazardous Waste Control Act
LDR	=	Land Disposal Restriction
MCL	=	maximum contaminant level
NA	=	not applicable
NAAQS	=	National Ambient Air Quality Standards
NESHAP	=	National Emission Standards for Hazardous Air Pollutants
NPL	=	National Priority List
NSPS	=	New Source Performance Standards
OU	=	Operable Unit
PCE	=	tetrachloroethene
POTW	=	Publicly Owned Treatment Works
RCRA	=	Resource Conservation and Recovery Act
RI/FS	=	Remedial Investigation/Feasibility Study
RWQCB	=	Regional Water Quality Control Board
SDWA	=	Safe Drinking Water Act
SJVUAPCD	=	San Joaquin Valley Unified Air Pollution Control District
SMAQMD	=	Sacramento Metropolitan Air Quality Management District
SMCL	=	Secondary Maximum Contaminant Level
SVE	=	soil vapor extraction
SWMU	=	Solid Waste Management Unit
SWRCB	=	State Water Resources Control Board
TCE	=	trichloroethene
UST	=	underground storage tank
VOC	=	volatile organic compound

Table 10-4. Determination of Soil Cleanup Standards for SWMU 1/Area 2, DDJC-Tracy

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of MCL c	Equilibrium Partitioning Limit Protective of Background Water Quality d	Model Level e	Soil Gas Cleanup standards
VOCs (Ig/kg)												
Tetrachloroethene (PCE)	NE	400	Yes	Yes	NA	NA	10	17,000	2.4	0.2	14	780 ppbv f
Trichloroethene (TCE)	NE	220 Ig/L g	Yes	Yes	NA	NA	10	7,000	1.3	0.3	NE	350 ppbv g,h

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon comparison of MCLs to soil-water concentrations.
d Equilibrium partitioning limit based upon comparison of detection limit to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, and based upon predicted achievement of MCL in groundwater at the source area.
f Soil cleanup standard for PCE corresponds to a target soil gas cleanup standard of 5.4 Ig/L (780 ppbv).
g TCE was detected only in soil gas at SWMU 1/Area 2.
h Soil cleanup standard for TCE corresponds to a target soil gas cleanup standard of 1.9 Ig/L (350 ppbv).

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remedial Goal
RBC = risk-bascd concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-5. Determination of Soil Cleanup Standards for Area 1 Building 237

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of MCL c	Equilibrium Partitioning Limit Protective of Background Water Quality d	Model Level e	Soil Gas Cleanup Standards
VOCS (Ig/kg)												
Tetrachloroethene (PCE)	NE	1,120	Yes	Yes	NA	NA	10	17,000	2.4	0.2	15	780 ppbv f
Trichloroethene (TCE)	NE	ND	NA	NA	NA	NA	10	7,000	1.3	0.3	NE	350 ppbv g

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon comparison of MCLs to soil-water concentrations.
d Equilibrium partitioning limit based upon comparison of detection limit to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, and based upon predicted achievement of MCL in groundwater at the source area.
f Soil cleanup standard for PCE corresponds to a target soil gas cleanup standard of 5.4 Ig/L (780 ppbv).
g Soil cleanup standard for TCE corresponds to a target soil gas cleanup standard of 1.9 Ig/L (350 ppbv).

HI = Hazard index
NA = not applicable
NE = not evaluated
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-6. Determination of Soil Cleanup Standards for Area 3

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of MCL c	Equilibrium Partitioning Limit Protective of Background Water Quality d	Model Level e	Soil Gas Cleanup Standards
VOCS (Ig/kg)												
Tetrachloroethene (PCE)	NE	227	Yes	Yes	NA	NA	10	17,000	2.4	0.2	22	780 ppbv f
Trichloroethene (TCE)	NE	440	NA	NA	NA	NA	10	7,000	1.3	0.3	32	350 ppbv g

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon comparison of MCLs to soil-water concentrations.
d Equilibrium partitioning limit based upon comparison of detection limit to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, and based upon predicted achievement of MCL in groundwater at the source area.
f Soil cleanup standard for PCE corresponds to a target soil gas cleanup standard of 5.4 Ig/L (780 ppbv).
g TCE was detected only in soil gas at SWMU 1/Area 2.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = Not Required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-7. Determination of Soil Cleanup Standards for SWMU 4

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	Ecological RBC	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Cleanup Standards
Pesticides (Ig/kg)											
Total DDX	3,877	NE	Yes	Yes	NA	241	3	5,600	NE	NE	241
Metals (Ig/kg)											
Lead	NE	NE	No	No	NA	5,130	NE	NE	NE	NE	5,130
Selenium	NE	25,000	No	No	NA	616	NE	NE	NE	NE	616

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon comparison of MCLs to soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of background threshold values in groundwater (A Horizon) or detection limits to soil-water concentrations.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = Not Required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-8. Chemical-Specific Requirements for Disposal of Soil/Sediment, DDJC-Tracy

Substances	STLC (mg/L)	TTLC Wet Weight (mg/kg)
Inorganic Substances		
Antimony and/or antimony compounds	15	500
Arsenic and/or arsenic compounds	5.0	500
Barium and/or barium compounds (excluding barite)	100	10,000 a
Beryllium and/or beryllium compounds	0.75	75
Cadmium and/or cadmium compounds	1.0	100
Chromium (VI) compounds	5	500
Chromium and/or chromium (III) compounds	5 b	2,500
Cobalt and/or cobalt compounds	80	8,000
Copper and/or copper compounds	25	2,500
Fluoride salts	180	18,000
Lead and/or lead compounds	5.0	1,300
Mercury and/or mercury compounds	0.2	20
Molybdenum and/or molybdenum compounds	350	3,500 c
Nickel and/or nickel compounds	20	2,000
Selenium and/or selenium compounds	1.0	100
Silver and/or silver compounds	5	500
Thallium and/or thallium compounds	7.0	700
Zinc and/or zinc compounds	250	5,000
Organic Substances		
Aldrin	0.14	1.4
Chlordane	0.25	2.5
DDT, DDE, DDD	0.1	1.0
Dieldrin	0.8	8.0
Dioxin (2,3,7,8-TCDD)	0.001	0.01
Endrin	0.02	0.2
Heptachlor	0.47	4.7
Lead compounds, organic	--	13
Lindane	0.4	4.0
Methoxychlor	10	100
Pentachlorophenol	1.7	17
Polychlorinated biphenyls (PCBs)	5.0	50
Trichloroethene	204	2,040

a Excluding barium sulfate.
b If the soluble chromium as determined by the TCLP set forth in Appendix I of Chapter 18 of this division, is less than 5 mg/L, and the soluble chromium, as determined by the procedures set forth in Appendix I of Chapter 11, equals or exceeds 560 mg/L and the waste is not otherwise identified as a RCRA hazardous waste.
c Excluding molybdenum disulfide.

STLC = Soluble Threshold Limit Concentration
TTLC = Total Threshold Limit Concentration

Source: Title 22, California Code of Regulations, Division 4.5, Section 66261.

Table 10-9. Determination of Soil Cleanup Standards for SWMU 6

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Model Level e	Cleanup Standards
Pesticides and Herbicides (Ig/kg)												
Dicamba	2.82	3.84	Yes	Yes	NA	NA	10	20,000,000	1.3	0.01	NE	10
Dieldrin	12.9	24.9	Yes	Yes	NA	NA	2	120	0.1	0.01	3 f	3
Endrin	1	66.7	No	Yes	NA	NA	3	200,000	21	0.1	NE	3
Heptachlor	13.5	23	Yes	Yes	NA	NA	1.5	420	0.1	0.04	NE	1.5
Lindane	1.23	56	Yes	Yes	NA	NA	1.7	1,500	0.2	<0.01	5	1.7
2,4,5-T	2.97	74.8	No	Yes	NA	NA	5	6,800,000	14	0.02	NE	5

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of numerical beneficial use limits to soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of background threshold values in groundwater (A Horizon) to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, and based upon predicted achievement of numerical beneficial use limit in groundwater at the source area.
f Model level extrapolated from SWMU 7, which has similar concentrations and distribution of dieldrin.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-10. Determination of Soil Cleanup Standards for SWMU 7

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Model Level e	Cleanup Standards g
VOCs (Ig/kg) - Pit F Only												
1,2-Dichloroethene	NE	7.1	Yes	Yes	NA	NA	10	120,000	1.2	0.2	NE	10
Trichloroethene (TCE)	NE	22	Yes	Yes	NA	NA	5	7,000	1.3	0.3	NE	5
SVOCs (Ig/kg) - Pit C Only												
bis(2-Ethylhexyl)phthalate	NE	5,700	No	Yes	NA	NA	330	140,000	224	122	NR	330
Pesticides and Herbicides (Ig/kg) - Pit C Only												
Dieldrin	12.9	69.5	Yes	Yes	NA	NA	3	120	0.1	0.01	3	3
Linuron	96	360	Yes	Yes	NA	NA	200	1,400,000	1	0.1	NE	200
Pesticides and Herbicides (Ig/kg) - Pit D Only												
2,4-D	3.06	23.4	No	Yes	NA	NA	25	6,800,000	11	0.01	NE	25
Dieldrin	12.9	7.49	Yes	Yes	NA	NA	3	120	0.1	0.01	3	3
Linuron	96	270	Yes	Yes	NA	NA	200	1,400,000	1	0.1	NE	200
Simazine	84	79.4	Yes	Yes	NA	NA	10	16,000	1	0.1	NE	10
Petroleum Hydrocarbons (Ig/kg - Pit D Only												
TPH as Diesel	NE	320	Yes	Yes	NA	NA	10	NE	NE	NE	NE	100,000 f

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of numerical beneficial use limits to soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of background threshold values in groundwater (A Horizon) to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, and based upon predicted achievement of numerical beneficial use limit in groundwater at the source area.
f Limits for TPH were determined using the scoring criteria in the Tri-Regional guidance.
g Cleanup standards serve as criteria for evaluating the continued need for institutional contents.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = Not Required
PRG = Preliminary Remediation Goal
RBC = Risk-Bascd Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-11. Determination of Soil Cleanup Standards for SWMU 8

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background Water Quality d	Model Level e	Cleanup Standards
SVOCs (Ig/kg)												
bis(2-Ethylhexyl)phthalate	NE	4,000	No	Yes	NA	NA	330	140,000	224	122	NR	330
Diethylphthalate	NE	120	No	Yes	NA	NA	330	10,000,000	1,222	0.2	NE	330
2,4-Dinitrotoluene	NE	220	Yes	Yes	NA	NA	330	1,400,000	9	0.4	NE	330
Naphthalene	NE	2,100	Yes	Yes	NA	NA	330	2,400,000	21	21	NE	330
Pesticides and Herbicides (Ig/kg)												
Chlordane, total	585	2,130	Yes	Yes	NA	NA	5	1,500	10	10	NE	10
2,4-D	3.06	47.2	Yes	Yes	NA	NA	25	6,800	11	0.02	NE	25
DDD	28.1	51,400	Yes	Yes	NA	NA	3	7,900	81	3	NR	81
DDE	1,284	15,200	No	No	NA	NA	3	5,600	NA	15	NR	NE
DDT	2,565	2,640	No	Yes	NA	NA	3	5,600	7	1	NR	7
DDX, Total	3,877	69,240	NA	NA	30,000 f	NA	3	NE	NA	NA	NE	30,000
Dieldrin	12.9	2,640	Yes	Yes	600 f	NA	2	120	0.1	0.01	2	2
Lindane	1.23	34.3	Yes	Yes	NA	NA	1.7	1,500	0.2	0.004	NE	1.7
Linuron	96	280	Yes	Yes	NA	NA	200	1,400,000	1	0.1	NE	200
MCPA	66.2	82.5	Yes	Yes	NA	NA	5,000	6,800,000	1	0.1	NE	5,000
Simazine	84	300	Yes	Yes	NA	NA	10	16,000	1	0.1	NE	10
Petroleum Hydrocarbons (Ig/kg)												
TPH as Gasoline	NE	11	Yes	Yes	NA	NA	NE	NE	NE	NE	NE	1,000 g
TPH as Diesel	NE	2,600	Yes	Yes	NA	NA	NE	NE	NE	NE	NE	10,000 g
TPH as Motor Oil	NE	14,000	Yes	Yes	NA	NA	NE	NE	NE	NE	NE	10,000 g

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of numerical beneficial use limits to soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of background threshold values in groundwater (A Horizon) or detection limits to soil-water concentration.
e Model level derived using vadose zone and groundwater modeling, based upon predicted achievement of MCL in groundwater.
f Risk-based cleanup standard based on mitigating exposure to future construction workers.
g Limits for TPH were determined using the scoring criteria in the Tri-Regional guidance.

HI = hazard index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remedial Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-12. Determination of Soil Cleanup Standards for SWMU 20 and Area 1 Building 10

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses In Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background Water Quality d	Model Level e	Cleanup Standards
VOCs (Ig/kg)												
Trichloroethene (TCE)	NE	630	Yes	Yes	NA	NA	10	7,000	1.3	0.3	36	5(350 ppb f)
Ethylbenzene	NE	6.1	No	Yes	NA	NA	5	230,000	653	1	NE	5
Xylenes	NE	35	No	Yes	NA	NA	5	320,000	582	0.3	NE	5
SVOCs (Ig/kg)												
Diethylphihalate	NE	490	No	Yes	NA	NA	330	10,000,000	1,222	0.2	NE	330
2,4-Dinitrophenol	NE	3,210	Yes	Yes	NA	NA	1,300	1,400,000	11	5	NE	1,300
Pentachlorophenol	NE	2,380	No	Yes	NA	NA	830	7,900	227	7	NE	830
2,4,6-Trichlorophenol	NE	1,420	Yes	Yes	NA	NA	330	170,000	10	7	NE	330
Pesticides and Herbicides (Ig/kg)												
Dieldrin	12.9	5.3	No	Yes	NA	NA	2	120	0.1	0.01	27	2
Methiocarb	820	900	Yes	Yes	NA	NA	500	NE	1	1	NE	500
MCPA	66.2	79.3	Yes	Yes	NA	NA	5,000	6,800,000	1	0.1	NE	5,000
Linuron	96	240	Yes	Yes	NA	NA	200	1,400,000	1	0.1	NE	200
Petroleum Hydrocarbons (Ig/kg)												
PH as Diesel	NE	500	Yes	Yes	NA	NA	NE	NE	NE	NE	NE	10,000 g

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of the numerical beneficial use limits to the soil-water concentration.
d Equilibrium partitioning limit based upon equivalency of background threshold values or PQLs to the soil-water concentration.
e Model level derived using vadose zone and groundwater modeling, based upon predicted achievement of MCLs in groundwater at the source area.
f Soil cleanup standard for TCE for treatment with SVE corresponds to a target soil-gas cleanup standard of 1.9 Ig/L (350 ppbv).
g Standards for TPH were determined using scoring criteria from Tri-Regional Guidelines.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = Not Required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-13. Determination of Soil Cleanup Standards for SWMU 24

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Cleanup Standards
VOCs (Ig/kg)											
Acetone	NE	860,000	Yes	Yes	NA	NA	10	8,800,000	89	1	10
2-Butanone (MEK)	NE	500	Yes	Yes	NA	NA	10	27,000,000	30	1	10
Ethylbenzene	NE	37,000	Yes	Yes	NA	NA	10	230,000	653	1	10
2-Hexanone	NE	66,000	Yes	Yes	NA	NA	10	NE	0.3	1	10
4-Methyl-2-pentanone (MIUK)	NE	80	No	Yes	NA	NA	10	2,800,000	436	1	10
Toluene	NE	160,000	Yes	Yes	NA	16,000 e	5	880,000	56	0.4	5
Xylenes	NE	200,000	Yes	Yes	NA	NA	5	320,000	582	0.3	5
SVOCs (Ig/kg)											
2,4-Dimethylphenol	NE	260	Yes	Yes	NA	NA	330	14,000,000	34	1	330
Fluoranthene	NE	23,000	No	Yes	NA	NA	330	27,000,000	8,023	3	330
2-Methylnaphthalene	NE	30,000	Yes	Yes	NA	NA	330	NE	6	6	330
4-Methylphenol	NE	880	Yes	Yes	NA	NA	330	3,400,000	17	1	330
Naphthalene	NE	20,000	Yes	Yes	NA	NA	330	240,000	21	21	330
Phenanthrene	NE	24,000	Yes	Yes	NA	NA	330	NE	14	14	330
Phenol	NE	350	Yes	Yes	NA	NA	330	100,000,000	1	0.3	330
Pyrene	NE	16,000	Yes	Yes	NA	NA	330	100,000	5,610	27	330
Petroleum Hydrocarbons (Ig/kg)											
TPH as Gasoline	NE	5,160	Yes	Yes	NA	NA	1	NE	NE	NE	1,000 f
TPH as Diesel	NE	1,390	Yes	Yes	NA	NA	10	NE	NE	NE	10,000 f
Pesticides and PCBs (Ig/kg)											
PCBs (Aroclor- 1260)	NE	450	Yes	Yes	NA	NA	30	340	182	45	30
Carbofuran	490	620	Yes	Yes	NA	NA	500	34,000,000	4	0.2	500
Lindane	1.23	30	Yes	Yes	NA	NA	1.7	1,500	0.2	0.004	1.7
Phorate	38.8	439	Yes	Yes	NA	NA	20	140,000	17	2	20
Ronnel	40.8	353	No	Yes	NA	NA	35	34,000,000	1,038	1	35

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of numerical beneficial use limits to soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of background threshold values in groundwater (A Horizon) or detection limits to soil-water concentrations.
e Risk-based cleanup standard based on mitigating exposure to future depot workers to toluene in indoor air and arbitrary assumption that toluene concentration must be reduced by a factor of 10.
f Units for TPH were determined using the scoring criteria in the Tri-Regional Guidelines.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-14. Determination of Soil Cleanup Standards for SWMU 27

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Model Level e	Cleanup Standards
VOCs (Ig/kg)												
Trichloroethene (TCE)	NE	5.9	No	Yes	NA	NA	5	7,000	1.3	0.3	36 f	5 R
SVOCS (Ig/kg)												
Benzo(a)pyrene	NE	6,100	No	No	1,000	NA	330	260	NA	NA	NE	1,000
Total PAHs	NE	22,900 JII	No	No	15,000 h	NA	460	33,800	NA	NA	NE	15,000
Pesticides, Herbicides, and PCBs (Ig/kg)												
2,4-D	3.06	4.36	No	Yes	NA	NA	25	6,800,000	11	0.02	NE	25
MCPA	66.2	142	Yes	Yes	NA	NA	5,000	680,000	1	0.1	NE	5,000
PCBs (Aroclor-1260)	NE	1,800 J14	No	No	1,000	NA	30	340	NA	NA	NE	1,000
2,4,5-T	2.97	5.69	No	Yes	NA	NA	5	680,000	14	0.02	NE	5
Petroleum Hydrocarbons (Ig/kg)												
TPH as Motor Oil	NE	12,000	Yes	Yes	NA	NA	10	NE	NE	NE	NE	10,000 L

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of the numerical beneficial use limits to the soil-water concentration.
d Equilibrium partitioning limit based upon equivalency of background threshold values in groundwater (A Horizon) or detection limits to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, based upon predicted achievement of MCLs in groundwater.
f Model level extrapolated from Area 1 Building 10, which has similar concentrations and distribution of TCE.
g Soil cleanup standard for TCE corresponds to a soil gas cleanup standard of 1.9 Ig/L (350 ppbv).
h Sum of benzo(a)anthracene, benzo(b)fluornanthene, benzo(k)fluoranthene, and ideno(1,2,3-cd)pyrene.
i Standards for TPH as motor oil were determined using scoring criteria for Tri-Regional guidance.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-16. Determination of Soil Cleanup Standards for SWMU 2 and SWMU 3

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Model Level e	Cleanup Standards
VOCs (Ig/kg)												

Table 10-15. Determination of Soil Cleanup Standards for Brum Storage Area Building 30

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Cleanup Standards e
SVOCs (Ig/kg)											
Benzyl alcohol	NE	1,300	No	Yes	NA	NA	330	10,000,000	1,618	0.3	330
bis(2-Ethylhexyl)phthalate	NE	2,800	Yes	Yes	NA	NA	330	140,000	244	122	330
Diethylphalate	NE	230	No	Yes	NA	NA	330	10,000,000	1,222	0.2	330
Di-n-butylphthalate	NE	96,000	Yes	Yes	NA	NA	330	68,000,000	83,401	119	330

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of numerical beneficial use limits to soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of detection limits to soil-water concentrations.
e Cleanup standards serve as criteria for evaluating the continued need for institutional controls.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-16. Determination of Soil Cleanup Standards for SWMU 2 and SWMU 3

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Model Level e	Cleanup Standards
SVOCs (Ig/kg)												
bis(2-Ethylhexyl)phthalate	NE	790	Yes	Yes	NA	NA	330	140,000	244	122	NE	330
2,4-Dimethylphenol	NE	450	No	Yes	NA	NA	330	14,000,000	34	1	NE	330
Di-n-butylphthalate	NE	4,600	No	Yes	NA	NA	330	68,000,000	83,401	119	NE	330
4-Methylphenol	NE	400	Yes	Yes	NA	NA	330	3,400,000	17	1	NE	330
Pesticides (Ig/kg)												
Aldrin	0.817	30.2	Yes	Yes	NA	NA	1.7	110	3	0.3	NE	3
Chlordane, total	585	32,900	No	Yes	8,000	NA	5	1,500	10	10	NR	10
DDD	28.1	13,100	No	Yes	NA	NA	3	7,900	1,600 f	1,600	NR	1,600
DDE	1,284	3,350	No	Yes	NA	NA	3	5,600	1,800 f	15	NR	1,800
DDT	2,565	8,900	No	Yes	NA	NA	3	5,600	1,700 f	1	NR	1,700
DDX, total	3,877	25,350	No	Yes	30,000	241	3	5,600	NA	NA	NR	241
Dieldrin	12.9	4,770	Yes	Yes	600	NA	2	120	370 f	0.01	0.1	370
Diuron	88.2	145	Yes	Yes	NA	NA	260	1,400,000	4	0.1	NE	260
Endrin	1	31.9	No	Yes	NA	NA	3	200,000	21	0.1	120 (120)	3
Lindane (Gamma-BHC)	1.23	40	Yes	Yes	NA	NA	1.7	1,500	0.2	0.004	NE	1.7
Monuron	100	220	Yes	Yes	NA	NA	260	NE	0.04	0.01	NE	260
2,4-D	3.06	16.9	No	Yes	NA	NA	25	6,800,000	47 f	0.2	NE	47
Heptachlor epoxide	0.765	6,250	Yes	Yes	NA	NA	1.5	210	0.004	0.002	NE	1.5
Metals (Ig/kg)												
Lead	NE	NE	No	No	NE	28,300		NE	NE	NE	NE	28,300
Selenium	514	13,500	No	No	NA	616		NE	NE	NR	NR	616

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of the numerical beneficial use limits to the Soil-Water concentration.
d Equilibrium partitioning limit based upon equivalency of background threshold values (A Horizon) or PQLs to soil-water concentrations.
e Model level derived using vadose zone and groundwater modeling, based upon predicted achievement of beneficial use limits in groundwater at the source area.
f Revised on basis of supplemental DI-WET results obtained during removal action.

HI = Hazard Index
NA = not applicable
NE = not evaluated
NR = not required
PRG = Preliminary Remediation Goal
RBC = Risk-Based Concentration
RL = Laboratory reporting limit corresponding to the lowest concentration that can be reproducibly detected as verified by the use of a low-level standard

Table 10-17. Determination of Soil Cleanup Standards for SWMU 33

Constituent	Background Threshold a	Maximum Concentration Detected	Threat to Beneficial Uses in Groundwater	Threat to Background Groundwater Quality	RBC E-06	RBC HI = 1	RL	Region IX PRG b	Equilibrium Partitioning Limit Protective of Beneficial Uses c	Equilibrium Partitioning Limit Protective of Background d	Model Level e	Cleanup Standards
VOCs (Ig/kg)												
Xylenes	NE	32	No	Yes	NA	NA	5	320,000	582	0.3	NE	5
SVOCS (Ig/kg)												
Diethylphthalate	NE	130	No	Yes	NA	NA	330	10,000,000	1,222	0.2	NE	330
Di-n-butylphthalate	NE	1,900	No	Yes	NA	NA	330	68,000,000	83,401	119	NE	330
Naphthalene	NE	2,800 J	Yes	Yes	NA	NA	330	800,000	21	21	NE	330
Pesticides (Ig/kg)												
Aldrin	0.817	1.54	No	Yes	NA	NA	1.7	110	3	0.3	NE	1.7
Carbaryl	230	540	Yes	Yes	NA	NA	400	68,000,000	24	0.2	NE	400
Dieldrin	12.9	22.6	No	Yes	NA	NA	2	120	0.1	0.01	27	2
Methiocarb	820	3,200	Yes	Yes	NA	NA	500	NE	NE	1	NE	500
Hydrocarbons (Ig/kg)												
TPH as Diesel	NE	15,100	Yes	Yes	NA	NA	10	NE	NE	NE	NE	100,000

a Background threshold values were determined for metals in all site soils; background threshold values for pesticides apply only to soils less than 2 feet deep.
b Region IX PRG based on industrial exposure scenario (USEPA, 1996).
c Equilibrium partitioning limit based upon equivalency of the numerical beneficial use limits to the soil-water concentrations.
d Equilibrium partitioning limit based upon equivalency of background threshold values (A Horizon) or detection limits to soil-water concentrations.
e Model level extrapolated from SWMU 7, which has similar concentrations and distribution of B2EHP.
f Standards for TPH as diesel was determined using the scoring criteria in the Tri-Regional guidance.

Table B-1.

Summary of Data Flags and Figure Abbreviations

Comments	Explanation
1	Qualified due to detected concentration in associated method blank sample.
2	Qualified due to detected concentration in associated trip blank sample.
3	Qualified due to integration nonconformances; bias cannot be determined.
4	Qualified due to detected concentration in associated equipment rinsate blank sample.
5	Qualified as positively biased due to surrogate recoveries above the established acceptance limits.
6	Qualified as negatively biased due to surrogate recoveries below the established acceptance limits.
7	Qualified due to surrogate recoveries outside the established acceptance limits; bias cannot be determined.
8	Qualified as positively biased due to MS/MSD recoveries above the established acceptance limits.
9	Qualified as negatively biased due to MS/MSD recoveries below the established acceptance limits.
10	Qualified due to MS/MSD recoveries outside the established acceptance limits; bias cannot be determined.
11	Qualified as positively biased due to LCS recoveries above the established acceptance limits.
12	Qualified as negatively biased due to LCS recoveries below the established acceptance limits.
13	Qualified due to LCS recoveries outside the established acceptance limits; bias cannot be determined.
14*	Qualified as positively biased due to calibration nonconformances.
15*	Qualified as negatively biased due to calibration nonconformances.
16	Qualified due to calibration nonconformances; bias cannot be determined.
17	Qualified as negatively biased due to holding time nonconformances.
18	Qualified as negatively biased due to sample receipt nonconformances.
19	Qualified as positively biased due to sample receipt nonconformances.
20	Qualified due to sample receipt nonconformances; bias can not be determined.
21	Qualified as positively biased due to other criteria (used twice, once for selenium and once for miscalculation).
22	Qualified as negatively biased due to other criteria (Not used).
23	Qualified due to other criteria; bias cannot be determined (Not used).
24	Qualified due to detected concentration in associated source water sample.
25	Reporting limit estimated due to low standard response.
26	Chromatogram did not match the diesel standard fingerprint pattern.
27	Retention time windows shifted during analysis.

DUP = duplicate sample
J = qualified as estimated
mg/kg = milligrams per kilogram
mg/L = milligrams per Liter
NC = No Constituents detected above laboratory reporting limit or above background
R = qualified as rejected
TEQ = toxicity equivalent, expressed as Ig/kg or Ig/L of 2,3,7-8 TCDD for soil and water, respectively.
TPHD = total petroleum hydrocarbons, diesel range
TPHG = total petroleum hydrocarbons, gasoline range
U = qualified as not detected
Ig/kg = micrograms per kilogram
Ig/L = microgram per Liter
* = most commonly used qualifiers
MS/MSD = matrix spike/matrix spike duplicate
LCS = laboratory control samples

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RESPONSIVENESS SUMMARY

A. OVERVIEW

Since 1942, the DDJC-Tracy facility has played an active role in the Tracy community, service as one of the largest employers in this historically agricultural region. According to the installation's 1994 Community Relations Plan, the Tracy community is generally well-informed about environmental concerns at the depot and generally supportive of the installation's efforts to remediate its contaminated sites.

In February 1997, DDJC-Tracy published and distributed a Proposed Plan for Twenty Sites (Proposed Plan), which summarized the cleanup alternatives considered in the DDRW-Tracy Comprehensive Remedial Investigation/Feasibility Study (RI/FS). The RI/FS identified twenty sites within the original installation boundaries where action is required to reduce the risks posed by on-site contaminants. Preferred remedial alternatives were identified for each of the twenty sites. The Proposed Plan was mailed to the installation's 1,200-address community contact list, and was presented and discussed at a public meeting held at the City of Tracy Community Center on 19 February 1997.

Although the meeting was well attended, no verbal comments specific to the cleanup alternatives presented in the Proposed Plan were received from the public. Public comments recorded at the 19 February meeting included questions about:

- The installation's history of success with the cleanup of large contaminant plumes, and the usual time frame for accomplishing such cleanups;
- The effectiveness of the installation's existing air stripper and groundwater treatment system;
- The reuse of treated groundwater for agricultural purposes;
- The reuse of industrial wastewater from other industries in the community;
- How the reinjection of treated groundwater impacts the movement of contaminant plumes;
- Other remediation projects under way at the installation; and
- Whether the installation is currently conducting any activities that would lead to the future need for remediation.

An adjacent property owner submitted the single written comment received on the Proposed Plan. In this comment the property owner expressed his overall support for several of the proposed alternatives, and his concern about the capacity and the cost of the proposed groundwater treatment system. This comment is addressed in Section C of the Responsiveness Summary, ("Summary of Public Comments Received During Public Comment Period, and Agency Responses").

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in environmental issues at DDJC-Tracy has been low to moderate throughout the course of the depot's history. Recurring issues of concern primarily involve the movement of contaminants in groundwater.

In 1980, DDJC-Tracy (then known as Defense Depot Tracy) began sampling a series of 14 groundwater monitoring wells. In May 1984, the depot advised the California Regional Water Quality Control Board (RWQCB) that the TCE and PCE levels in three of these wells exceeded the respective state action levels. The depot's on-post newsletter, the Tracy Triangle, addressed this situation in several articles beginning in July 1984.

Contamination issues at the DDJC-Tracy depot began to receive widespread coverage in the local and regional press when, in July 1985, the installation was identified as one of a number of sites to be studied by a county toxic waste task force. Nearby residents and the principal of the nearest school were invited to a public meeting at Defense Depot Tracy on 2 April 1986 to discuss the depot's groundwater monitoring program, the test results, and future plans. Media attention continued as the installation added monitoring wells both on- and off-site. In July 1986, State Assembly member Patrick Johnston toured the site's groundwater monitoring facilities. The installation's first Community Relations Plan (CRP) was also prepared that year.

Public participation activities waned until DDJC-Tracy was placed on the National Priorities List of the U.S. Environmental Protection Agency's on August 30, 1990. Following this listing, opportunities for community involvement in environmental restoration activities increased. DDJC-Tracy issued a number of press releases, held public comment periods on new environmental study documents, and conducted several public meetings.

In May 1991, a series of interviews was conducted with community residents and representatives. Community attitudes toward the depot and its environmental restoration program were mostly favorable. Community concerns at that time included the effects that a State of California "red line" around the depot might have on local real estate, the impacts that the injection well system might have on local aquifers, the length of the cleanup period, efforts to contain the contamination, and the desire for more information about the depot's environmental restoration activities. Interviewees expressed an interest in attending public meetings and in receiving newsletters and status reports. The CRP was updated to reflect this new input.

The CRP was again updated in 1994. At that time, the principal environmental concerns within the community involved the ongoing drought and the dropping groundwater table. Related concerns included groundwater contamination of the Upper Tulare Aquifer due to saltwater intrusion and/or various chemical and hazardous materials spills.

In September 1995, DDJC-Tracy received a great deal of media attention when the depot announced it had discovered pesticide residues in the lawn outside the installation's on-site Child Development Center. DDJC-Tracy acted quickly to excavate and replace the lawn, and to keep concerned parents and the community informed throughout this process. A public meeting was held on 13 September 1995, at the Child Development Center site to present the excavation plan and to answer all questions regarding the health and safety of the children attending the facility. Specialists in the fields of toxicology and risk assessment were included on the depot's presentation panel and informational handouts were made available. The meeting was very well attended, and DDJC-Tracy received high marks from the community and the press for its proactive handling of this incident.

In June 1996, DDJC-Tracy initiated a new series of informational fact sheets for distribution to the installation's community contact list. Fact Sheet #1 summarized the Engineering Evaluation/Cost Analysis (EE/CA) for three on-post waste sites. A postage-paid environmental concerns questionnaire was included with the fact sheet mailing.

A mailing to the community contact list in February 1997 served several purposes. The mailing, which was introduced with a letter from DDJC's Commander, Captain Michael Casey, transmitted a copy of the installation's Proposed Plan for Twenty Sites and requested public comments on this document. The mailing announced a public meeting to be held 19 February 1997 to discuss the Proposed Plan. Fact sheet #2 also announced DDJC-Tracy's plans to reinstitute a Technical Review Committee (TRC), and included a TRC membership application form. Per discussions with Cal-EPA's Department of Toxic Substances Control, it was determined that, due to the generally low level of interest within the community, it was not necessary to establish a Restoration Advisory Board at the depot. Instead, the TRC concept would be expanded to allow for more input from community members.

The first meeting of the installation's new TRC, held at the City of Lathrop Council Chambers on 22 May 1997 was attended by eleven community members of the TRC. Topics of discussion included TRC formation logistics and the status of the installation's remedial program.

A chronology of community involvement activities and media coverage to date is attached to this document.

C. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD, AND AGENCY RESPONSES

Part I - Summary and Response to Local Community Concerns

<u>Remedial Alternative Preferences</u>

(1) Asphalt capping and encapsulation appear to be steps in the right direction, as toxics become more of a hazard when they are extracted or otherwise entrained.

DDJC-Tracy Response: Comment noted.

(2) Alternatives involving excavation increase the potential for exposure to toxics.

DDJC-Tracy Response: Construction crews performing the excavation may be subject to some additional risk. These crews can use risk reduction techniques, engineering controls, and personal protective equipment to control any potential exposure to excavated contaminants. The soil can be wetted to minimize airborne dust, and the excavated material can be transported in covered vessels. These measures will minimize short-term exposure to construction crews and the general public.

Excavation reduces the risk of exposure within the surrounding community. The proposed excavations are primarily designed to remove threats or potential threats to groundwater quality. If the contaminants are not excavated from the sites in question, they will be more likely to contact groundwater and migrate beyond the depot boundaries.

Technical Comments

(1) If the injection wells are of insufficient capacity to handle the anticipated volumes of treated wastewater, and overflow occurs as a result, then site conditions will not have improved significantly.

DDJC-Tracy Response: The injection system is one of the most difficult design issues to address. DDJC-Tracy will probably construct injection galleries to discharge the treated water. The galleries are more expensive than injection wells, but can handle larger volumes of treated water. Additional injection galleries can be constructed if the need arises.

Cost Issues

(1) Given the limited number of families living in the path of the groundwater contaminant plume, an alternative less costly than the proposed air stripper and groundwater treatment system would probably be acceptable.

DDJC-Tracy Response: The groundwater treatment system primarily addresses the portions of the groundwater plume that exceed federal and state action levels. These federal and state standards apply to all aquifers regardless of the number of people potentially impacted by a plume. DDJC-Tracy will fund the design, construction, and operation of a treatment system that will reduce contaminant concentrations to these action levels. Portions of the plumes with concentrations below the action levels will be left to attenuate.

Part II - Comprehensive Response to Specific Legal and Technical Questions

(Not applicable.)

D. REMAINING CONCERNS

(Not applicable.)

Attachment A
Chronology of Community Involvement Activities and Media Coverage

July 1984 - An environmental update of the depot's groundwater testing program appeared in DDRW-Tracy's monthly newsletter, the Tracy Triangle.

September 1984 - A short article in the Tracy Triangle presented the results from the June sampling of the 14 groundwater monitoring wells. The tests revealed traces of PCE and TCE above state action levels in some wells.

December 1984 - A front-page article in the Tracy Triangle indicated plans to add 12 monitoring wells to track the source, or sources, of the chemicals.

May 1985 - An article in the DLA Dimensions announced that the drinking water at DDRW-Tracy meets or exceeds all requirements of both state and federal agencies.

19 July 1985 - An article in the Tracy Press announced that DDRW is one of 61 sites to be looked at by a county toxic task force.

20 July 1985 - A front-page article in the Manteca Bulletin announced that a task force would study toxic waste sites in the area, including DDRW.

20 July 1985 - An article in the Stockton Record announced that Assembly member Patrick Johnston and Supervisor Bill Sousa would be forming a task force to help the state agencies do better jobs and that the task force recognized DDRW as a toxic waste site.

22 July 1985 - An article in the Tracy Press stated that a task force had been formed to study toxic waste sites in San Joaquin County, including DDRW.

24 July 1995 - A front-page article in the Manteca News listed DDRW as one of the toxic sites to be reviewed.

20 September 1985 - An article in the Modesto Bee announced that DDRW was preparing to drill more test wells to determine whether the solvents contaminating the base's groundwater were migrating onto surrounding farmland.

26 November 1985 - An article in the Modesto Bee stated that the San Joaquin County Toxic Task Force wanted the military to adopt special safeguards in the event DDRW was selected as a regional storage center for hazardous waste.

2 April 1986 - A public meeting was held at DDRW-Tracy to discuss the groundwater monitoring program, test results, and future plans. Nineteen residents and the principal of the nearest school were invited. Fourteen residents were in attendance.

8 April 1996 - A press release was issued to announce the results from the additional monitoring wells and plans to install test wells off-site.

July 1986 - California State Assembly member Patrick Johnston toured the site and was brought up to date on the groundwater monitoring program.

July 1989 - An article in the Tracy Triangle announced DDRW's placement on the National Priorities List (NPL) of the U.S. Environmental Protection Agency.

14 July 1989 - An article in the Stockton Record announced that DDRW had been placed on the NPL by the U.S. EPA.

30 July-30 August 1989 - A Public Notice in the Tracy Press announced a public comment period on the Draft Negative Declaration for the interim remediation system for groundwater.

9-11 May 1990 - A public notice in the Tracy Press announced a public comment period and a public meeting at the Tracy Public Library on a Draft Interim Remedial Action Plan for site cleanup activities.

30 August 1990- The Federal Register announced DDRW's placement on the National Priorities List.

12 July 1991 - Public notices in the Tracy Press and Stockton Record requested public comment on the Federal Facility Agreement for DDRW-Tracy.

30 August 1991 - Public Notices in the Tracy Press and Stockton Record requested public comment on the Primary Document Delivery Dates for DDRW-Tracy.

15 October 1991 - An article in the Modesto Bee discussed DDRW Tracy's efforts to locate a site for the depot's information repository.

3 August 1992 - An article in the Stockton Record updated the public on the cleanup processes being conducted at DDRW-Tracy.

24 December 1992 - Public notices in the Tracy Press and Stockton Record announced a public comment period and public meeting at the Tracy Public Library on the Feasibility Study/Proposed Plan for Operable Unit 1.

14 January 1993 - An article in the Modesto Bee announced a public meeting for the Proposed Plan for DDRW-Tracy.

15 January 1993 - An article in the Stockton Record discussed the public meeting held on 14 January 1993.

23 February 1994 - An article in the Tracy Press discussed the air-stripping process at DDRW-Tracy.

30 March 1994 - A front-page article in the Stockion Record listed DDRW-Tracy as one of three Superfund cleanup sites in San Joaquin County.

9 September 1995 - Articles in the Tri-Valley Herald and the Stockton Record reported the discovery of traces of the long-banned pesticide DDT in the lawn area surrounding the Child Development Center at DDRW-Tracy and described DDRW-Tracy's response.

13 September 1995 - DDRW-Tracy held a public meeting to discuss actions taken in response to the discovery of DDT in the lawn area surrounding the on-post Child Development Center. A panel of experts was available to answer questions from the community.

22 April 1996 - DDRW environmental and public affairs staff teamed with Radian Corporation to host an environmental awareness program and open house for local high school students in conjunction with Earth Day.

23 April 1996 - Articles in the Stockton Record, Manteca Bulletin, Modesto Bee, and Tracy Press reported on Earth Day activities at DDRW-Tracy and DDRW-Sharpe.

June 1996 - A fact sheet describing the Engineering Evaluation/Cost Analysis at three DDRW-Tracy waste sites was distributed to the community contact list.

January 1997 - DDRW-Tracy's Proposed Plan for Twenty Sites (Proposed Plan) was mailed to the community contact list, along with a fact sheet that announced the reintroduction of the Technical Review Committee and encouraged public participation.

8 February 1997 - An article in the Tracy Press announced the upcoming public meeting on DDRW-Tracy's Proposed Plan.

8 February 1997 - A front-page article in the Tracy Press reported that a small amount of corrosion inhibitor had leaked during transport and described DDRW-Tracy's response.

9 February 1997 - An article in the Stockton Record announced upcoming public meetings to discuss cleanup proposals at the DDRW-Tracy and DDRW-Sharpe depots.

22 May 1997 - A new Technical Review Committee met to learn about the progress of DDRW-Tracy's Installation Restoration Program.

RESPONSE TO AGENCY COMMENTS

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FINAL

DEFENSE DISTRIBUTION DEPOT SAN JOAQUIN (DDJC), TRACY SITE
TRACY, CALIFORNIA

SITE-WIDE COMPREHENSIVE RECORD OF DECISION

VOLUME 2 OF 2
(APPENDICES)

<IMG SRC 98030PK>

U.S. Army Corps of Engineers
Engineering and Support Center
Huntsville (CEHNC)
4820 University Square
Huntsville, Alabama 35816-1822
Attn: CEHNC-PM-ED

Prepared by:

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10389 Old Placerville Road
Sacramento, California 95827

April 1998

APPENDIX A

ADMINISTRATIVE RECORD FILE INDEX

Decision

Administrative Record File Index - DDJC Tracy

Date	Author	Addressee	Subject
67/07/01	DWR	DDTC	San Joaquin County Groundwater Investigation.
80/07/21	USEHA	DDTC	Solid Waste Special Study No. 10-61-0165-81, Defense Depot Tracy, Tracy, California
80/10/01	USATHAMA	DDTC	Installation Assessment of Defense Depot Tracy, California, Report #181
82/06/01	Jefferson Assoc., Inc.	DDTC	Environmental Assessment, Defense Depot Tracy, Tracy California
82/10/12	DDTC-J	DLA-WS	Information to DLA regarding the DoD Installation Restoration Program.
83/08/05	DDTC-J	EPA	Letter forwarding statistical data requested during a telephone conversation on 2 August 1983.
84/05/07	DHS	DDTC-J	Letter informing DDTC that the industrial pond does not require a permit.
84/05/30	RWQCB	DDTC-J	Letter forwarding a report regarding the inspection of DDTC on 2 Apr 84.
84/06/01	DDTC-J	RWQCB	RWQCB response to letter of 11 May 84 (Groundwater Monitoring Program).
84/06/15	DDTC-J	RWQCB	Transmittal of the plan for sampling, preserving, and analyzing groundwater.
84/06/26	RWQCB	DDTC-J	Letter requesting DDTC purge wells by pumping water until pH, electrical conductivity, and temperatures stabilize, rather than by pumping 3 to 5 volumes as suggested.
84/07/05	DDTC-J	RWQCB	Response to RWQCB letter dated 26 June 1984.
84/07/05	USAEHA	DDTC-J	Correspondence providing information and guidance concerning actions being taken to correct monitoring program problems.
84/07/17	RWQCB	DDTC-J	Letter regarding the time schedule for submittal of analytical results.
84/07/26	USAEHA	DDTC-J	Request for review of the plan for the groundwater investigation at DDTC.
84/08/07	USAEHA	DDTC-J	Notification of a groundwater consultation scheduled for DDTC during the period 17-20 September 1984.
84/09/05	USAEHA	DDTC-J	Request that installations use only the new containers for the groundwater monitoring program and return all old and extra containers to USAEHA.
84/10/05	DDTC-J	USAEHA	Minutes of the Groundwater Consultation meeting between USAEHA, RWQCB and DDTC.
84/10/10	DHS	RWQCB	DHS review comments on the plan for groundwater quality investigation at DDTC.
84/11/02	DHS	DDTC-D	Clarification as to what the Toxic Substances Control Division can and will require in regard to the hazardous waste site investigation.
84/11/13	RWQCB	USAEHA	RWQCB comments on the groundwater investigation.
84/11/21	USAEHA	DLA-WS	Groundwater Consultation No. 38-26-0474-85, Strategy for Groundwater Quality Investigation, Defense Depot Tracy, Tracy, California, 17-20 September 1984.
85/01/10	DHS	DDTC-D	DHS comments on the Hazardous Waste Site Investigation at DDTC.
85/02/01	USATHAMA	DDTC	Geohydrological Study No. 38-26-0488-85, Defense Depot Tracy, California
85/07/12	RWQCB	DDTC-J	Letter regarding the status of the SOW for the groundwater contamination project.
85/08/01	SJLHD	DDTC-J	Closure plan for the underground storage tanks at DDTC.
85/08/02	RWQCB	DDTC-J	Comments on the draft Statement of Work for the hazardous contamination investigation at DDTC.
85/08/15	DDTC-J	RWQCB	DDTC response to letter of 2 Aug 85 (draft Statement of Work for the hazardous contamination investigation.
85/08/28	DDTC-J	SJLHD	Notice of the formulation of a closure plan for underground storage tanks.
85/09/13	DHS	Commander, DDTC	Draft Statement of Work for hazardous waste contamination investigation.
85/11/13	RWQCB	Commander, DDTC	RWQCB comments on the draft plans for the geohydrological investigation.

Date	Author	Addressee	Subject
85/11/14	RC	DDTC	Geohydrological Investigations, Final Plans, Defense Depot Tracy, Tracy, California
85/12/13	DDTC-WB	RWQCB	RWQCB response to letter of 13 Nov 85 (Geohydrological Investigations)
86/03/01	SJLHD	DDTC-WB	Permanent closure tank removal policy
86/03/04	Radian	Coe, Huntsville	Geohydrological Investigations Draft Engineering Report, DDRW-Tracy
86/04/07	CoE	DDTC-J	Recommendation for Phase II, groundwater contamination confirmation and corrective action investigation at DDTC.
86/04/11	DDTC-WB	CoE	Confirmation that Options 1 and 2 not be exercised under the current contract with Radian Corporation.
86/06/11	DDTC-WB	RWQCB	Request review/comment for the proposed scope of work for the continuation of the Groundwater Quality Assessment Study.
86/06/12	CoE	DDTC-W	Letter forwarding the proposed SOW for the Phase II and III, IRP, Groundwater Contamination Assessment at DDTC.
86/07/14	DHS	Deputy Commander, DDT	Comments on the draft Geohydrological Investigations Report.
86/07/17	DDTC-WB	RWQCB	Request for comments on the Radian Corporation's Draft Final engineering Report.
86/08/05	RWQCB	DDTC-J	RWQCB's comments to the Geohydrological Investigation.
86/08/15	RWQCB	RWQCB	Disposal, treatment, and reuse of soils contaminated with petroleum fractions.
86/08/27	RC	DDTC	Geohydrological Investigations, Final Engineering Report, Defense Depot Tracy, Tracy, California
86/10/20	WCC	CoE	Minutes for the pre-construction meeting held on 15 October 1986.
86/11/07	WCC	CoE, Huntsville	Draft Phase II Work Plans RI/FS
86/11/12	CoE	DDTC-WB	Request for review comments on the RI/FS Work Plans.
86/11/13	DDTC-W	DHS	Letter forwarding the Phase II Work Plans, RI/FS.
86/11/26	DHS	DDTC-J	Request for a 30-day extension to comment on the Phase II Work Plan RI/FS.
86/12/01	WCC	DDTC	Phase II Work Plans, Remedial Investigation/Feasibility Study, Defense Depot Tracy
87/02/01	CoE	WCC	Request to change analytical laboratory to perform the USEPA Method 601 and 602
87/03/06	WCC	DDTC	Letter Report Number 1, Defense Depot Tracy, Tracy, California.
87/03/16	DHS	DDTC-J	DHS comments and recommendations of the Phase II Work Plans for the RI/FS.
87/03/19	WCC	DDTC	Draft Letter Report Task 8, Sampling and Analysis of Private Wells, Defense Depot Tracy.
87/04/01	WCC	DDTC	Work Plans, Remedial Investigation/Feasibility Study, Defense Depot Tracy.
87/04/09	WCC	DDTC-W	Cost estimate for sampling and analysis of the Raspo Well 3AG.
87/04/13	DDTC-W	SJCHD	Letter transmitting the Work Plans for the RI/FS.
87/04/17	CoE	WCC	Response to WCC letters dated 31 March 1987 and 3 April 1987.
87/04/17	DDTC-W	RWQCB	Notification that Well #12 will be tested again to verify the finding of the first test.
87/04/17	DDTC-W	DHS	Letter transmitting the well log for the irrigation well located approximately 300 feet north of DDTC's northern boundary.
87/04/17	DDTC-W	WCC	Letter transmitting the well log for the irrigation well located approximately 300 feet north of DDTC's northern boundary.

Date	Author	Addressee	Subject
87/04/17	DDTC-W	DHS	Notification that Well #12 shall be tested again to verify the finding of the first test.
87/04/19	WCC	CoE	Letter submitting Addendum No. 2 to the work plans for Tasks 30 and 32.
87/04/22	DDTC-W	DLA-WS	Request for funds to exercise options and Huntsville Division support for the RI/FS.
87/04/22	DHS	DDTC-W	Letter confirming staff approval of the placement of 10 groundwater monitoring wells.
87/04/23	DHS	DDTC-WB	Underground storage tank closure plan, notice of deficiencies.
87/04/30	CoE	WCC	CoE review comments on the RI/FS letter reports and work plans.
87/05/13	DHS	DDTC-J	Letter approving the request for a change in the classification of core material extracted during the construction of off base groundwater monitoring well.
87/05/20	DDTC-W	DHS	Addendum to the tank closure plan.
87/06/13	WCC	DDTC	Letter Report Number 2,DDTC
87/07/10	DDTC-G	DDTC-D	Letter regarding the damages arising from exercise of right-of-way to Mr. Frank J. Raspo's property.
87/07/13	RWQCB	RWQCB	Minutes of 7 July 1987 meeting held at DDTC.
87/07/20	WCC	CoE	Letter forwarding 4 copies of Draft Work Plans for the Part 2 field work to be performed as part of the RI/FS.
87/07/21	WCC	CoE	Minutes of the Project Review Meeting at DDTC held 7 July 1987.
87/07/31	DDTC-W	WCC	Letter transmitting DHS' letter regarding material reclassification.
87/08/10	DDTC-W	SJCHD	Notification that DDTC will comply with request to provide all analytical results, geotechnical data and site assessment inform.
87/08/19	RWQCB	DDTC-W	Minutes for Waste Discharge Requirements and Groundwater Progress Review Meeting held on 7 July 1987.
87/08/26	RWQCB	DDTC-W	RWQCB comments on the work plan for the remedial investigation.
87/09/29	WCC	CoE	Letter forwarding an addendum to the proposed Part 2 Work Plan.
87/10/14	DHS	DDTC-WB	Notice that the closure plan has adequately addressed all of the issues needed to ensure the proper closure of the unit.
87/10/19	RWQCB	DDTC-W	RWQCB comments on the groundwater RI/FS.
87/10/21	CoE	DDTC-WB	Request for funds to contract for an aquifer pump test in Contaminated Area 2.
87/10/29	WCC	WCC	Summary of the chemical analysis data from the 48 soil borings identified as SB31 and SB52 that were drilled and sampled from 17-20 August 1987.
87/11/20	DDTC-W	RWQCB	DDRW addressing RWQCB's concerns regarding the groundwater RI/FS.
88/02/01	WCC	DDTC	Letter Report Number 3, DDTC
88/03/10	WCC	CoE	Minutes from Progress Review Meeting Two on the Defense Depot Tracy RI/FS project.
88/03/17	DLA-WS	DDTC-W	State of California involvement in interagency agreements for clean up of hazardous waste sites.
88/03/28	WCC	CoE	Letter advising DDRW the drilling subcontractor for performing soil boring and sampling work within the Southern Pacific Railroad right of way is Exceltech, Inc.
88/04/01	ECOS, Inc.	DDTC	Tank Closure Report for Buildings 28 and 247, Underground Storage Tanks at DDTC.
88/04/04	DDTC-W	SJLHD	Letter forwarding the proposed work plans for additional well sampling and soil borings.
88/04/04	DDTC-W	DHS	Letter forwarding the proposed work plans for additional well sampling and soil borings.
88/04/04	DDTC-W	RWQCB	Letter forwarding the proposed work plans for additional well sampling and soil borings.

Date	Author	Addressee	Subject
88/04/18	SJLHD	DDTC-WB	Review comments by SJLHD on Phase II of the rank removal closure plan.
88/04/18	WCC	CoE	Letter transmitting four copies of the proposed Addendum No. 1 to the work plans for Tasks 30 and 32.
88/04/21	WCC	SPTC	Letter submitting Contractors Right of Entry Forms, Exhibit A, and Certificate of Insurance.
88/04/29	WCC	DDTC	Draft Remedial Investigation Engineering Report, DDTC
88/05/19	DDTC-W	CoE	DDTC comments on the Remedial Investigation/Feasibility Study.
88/05/27	DDTC-W	CoE	DDTC comments on the Draft Remedial Investigation Engineering Report.
88/05/27	RWQCB	DDTC-D	Letter requesting that DDTC continue with the groundwater investigation immediately.
88/06/10	DDTC-W	CoE	Letter forwarding RWQCB's comments on the RI/FS groundwater project.
88/06/17	Canonie Environmental	DDTC	Point Source Sampling Investigation.
88/06/20	WCC	CoE	WCC recommending that both Options 11 and 12 be exercised at this time, for a total of 22 new wells to be installed.
88/06/22	WCC	CoE	Summarization of the status of efforts to obtain approval from the Southern Pacific to drill soil borings within its right of way adjacent to DDTC.
88/06/23	WCC	DDTC	Letter Report Number 4, DDTC
88/07/19	DDTC-W	RWQCB	Letter transmitting a copy of Letter Report Number 4, which summarizes the last laboratory analysis from 63 monitoring wells associated with the RI of groundwater and soil.
88/08/15	RWQCB	RWQCB	RWQCB review comments for the Groundwater Remedial investigation.
88/08/23	WCC	CoE	Letter transmitting notes summarizing the discussions and conclusions from Progress Review Meeting Three on the RI/FS project.
88/08/24	DHS	DDTC-W	Review comments on the proposed off-site well installation.
88/09/07	WCC	DDTC	Work Plan Section 11.0, Additional Groundwater Monitoring Wells, DDTC
88/09/13	WCC	CoE	WCC proposed comments to the comments submitted by RWQCB.
88/09/22	DDTC-WB	EPA	Request for comments on the closure plan for the underground storage tanks.
88/09/22	DDTC-WB	DHS	Request for comments on the closure plan for the underground storage tanks.
88/10/17	DHS	DDTC-D	Contract stipulations for the RI/FS does not allow sufficient flexibility for changing situations.
88/10/20	RWQCB	DDTC-D	Letter recommending that the final contract contain provisions for maintaining flexibility in the RI/FS process.
88/11/01	WCC	CoE	Comments and discussion in response to RWQCB and DHS letters regarding the remedial investigations currently underway at DDTC.
88/11/28	Kleinfelder	DDTC	Soil Sampling Investigation, DDTC
88/11/28	Raymond Vail & Assoc.	DDTC	Preliminary Submittal, Proposed Improvements for Evaporation Ponds, 1, 2, and 3, and Various Sanitary Conveyance Facilities.
88/11/29	DDTC-W	DHS	Response to letters from RWQCB and DHS.
88/11/29	DDTC-W	RWQCB	Response to letters from RWQCB and DHS.
88/12/05	Canonie Environmental	Professional Consultants, Inc.	Detection limits of the samples taken on 5 April 1988.

Date	Author	Addressee	Subject
88/12/05	WCC	CoE	Fact sheet delineating the content of each RI/FS report deliverable.
88/12/12	RMS Prof. Consults, Inc.	PVER, Inc.	Transmittal of contract prints of the photos of the fuel tank excavation.
88/12/13	DDTC-WB	CoE, Huntsville	Comments on the Statement of Work for the aquifer pump test.
88/12/13	WCC	CoE	Submission of a revised Fact Sheet which describes DDTC's report deliverables.
88/12/23	WCC	DDTC	Phase I Remedial Investigation Report, DDTC
89/01/10	DDTC-WB	CoE	Review comments for the Draft Phase I Remedial Investigation Report.
89/01/10	ERC	CoE, Huntsville	Preliminary Draft Work Plan Aquifer Pump Test Defense Depot Tracy
89/01/23	DHS	DDTC-WB	Request for additional information to complete closure certification report for underground waste storage tanks at Building 247 and Warehouse 28.
89/01/26	DDTC-WB	DHS	Additional information necessary to meet State Underground Tank Closure requirements.
89/01/30	ERC	CoE, Huntsville	Draft Work Plan Aquifer Pump Test Defense Depot Tracy
89/02/24	DDTC-WB	DHS	Copy of the draft Work Plan for the Aquifer Pump Test.
89/02/24	DDTC-WB	RWQCB	Copy of the draft Work Plan for the Aquifer Pump Test.
89/02/27	CoE	WCC	Request for WCC to incorporate review comments in the Phase II Remedial Investigation/Feasibility Study (RI/FS).
89/03/01	ERC EESC	DDTC	Work Plan, Aquifer Pump Test, DDTC
89/03/09	WCC	DDTC	Data Analysis Supporting Task 36 Well Locations for DDTC
89/03/24	ERC	CoE, Huntsville	Draft Aquifer Pump Test Engineering Report, Defense Depot Tracy
89/04/07	RWQCB	RWQCB	Comments for Phase I Remedial Investigation report.
89/04/07	WCC	DDTC	Technical Submittal of Task 28 - Part 1, Groundwater Sampling and Analysis for DDTC.
89/04/10	DDTC-WB	CoE	Request the development of a delivery order contract for the installation, operation, and maintenance of a remediation system to mitigate groundwater contamination.
89/04/11	RWQCB	DDTC-WB	RWQCB's comments to the Phase I Remedial Investigation Report and Data Analysis Supporting Task 36 Well Locations.
89/04/11	RWQCB	DDTC-WB	Draft DHS comments on the geology and well placement.
89/04/25	CoE	WCC	CoE comments and request that Phase I of the RI/FS be revised to include more analysis and correlation of the field data.
89/04/25	DDTC-WB	CoE	Request the development of a delivery order contract for a supplemental study to the existing RI/FS.
89/04/28	ERC EESC	DDTC	Aquifer Pump Test Engineering Report, DDTC
89/04/28	ERC EESC	DDTC	Evaluation of Groundwater Withdrawal and Treatment, DDTC.
89/05/11	ERC EESC	DDTC	Section C, Description/Specification/Work Statement Data Items DD 1423 and DD 1664, Interim Remedial Measure, Defense Depot Tracy, California
89/05/12	DHS	DDTC-WB	Comments to the Phase I Draft Remedial Investigation report and the Data Analysis Task 36 Well Locations Report.
89/05/15	DDTC-WB	RWQCB	Status report on the RI/FS project.

Date	Author	Addressee	Subject
89/05/16	DDTC-WB	RWQCB	Request for comments on the Aquifer Pump Test Report; Evaluation of Groundwater Withdrawal and Treatment, FS; Environmental Assessment; ROD; and Work Statement for IRM.
89/05/16	ERC EESC	DDTC	Environmental Assessment, Interim Groundwater Remediation System, Defense Depot Tracy, California
89/05/16	ERC EESC	DDTC	Record of Decision - Interim groundwater Remediation System - Defense Depot Tracy, California
89/05/26	CoE	DDRW-WB	Draft scope of work for the Supplemental Study to the RI/FS.
89/06/06	DDTC-WB	CoE	DDTC-WB's response to telefax of 25 May 1989 (Industrial Process Assessment and Process Alternatives Evaluation).
89/06/26	RWQCB	DDTC-W	RWQCB comments on the RI/FS Engineering Report, Volume I.
89/07/03	WCC	DDTC	Draft RI/FS Engineering Report DDTC.
89/07/05	DDTC		Negative Declaration for Interim Remediation System (Air Stripper) for Groundwater Treatment, US Defense Logistics Agency, Defense Depot Tracy, Tracy, California
89/07/10	DHS	DDTC-WB	Comments on the proposed Interim Remedial Measure (IRM).
89/07/10			Contract DACA87-89-R-0099, Interim Groundwater Withdrawal, Treatment and Disposal System
89/07/19	RWQCB	DDTC-WB	RWQCB's comments on the Statement of Work for the Interim Groundwater System.
89/07/19	WCC	DDTC	Work Plan, Section 13.0, Additional Groundwater Monitoring Wells for DDTC
89/07/20	DDTC-WB	RWQCB	Submittal of analysis on the sanitary and industrial sewerage system.
89/07/25	CoE, Huntsville		Solicitation/Modification of Contract for Interim Groundwater Withdrawal Treatment and Disposal System
89/07/28	CoE	WCC	Request that the disposition of the comments be in separate correspondence and the incorporation of the changes in the final feasibility study.
89/07/28	CoE	WCC	CoE's comments on the RI/FS to WCC.
89/08/09	DDTC-W	CoE	DDTC review comments to the RI/FS contract modification.
89/08/18	DHS	DDTC-WB	DHS comments on the Interim Groundwater Withdrawal, Treatment, and Disposal System.
89/09/05	DDTC-W	EPA	Letter proposing that DDTC be deleted from further consideration as an NPL site.
89/09/05	DDTC-W	EPA	Letter proposing that DDTC be deleted from further consideration as an NPL site.
89/11/20	Ensotech, Inc.	DDTC	Permit for Drilling 18 Wells at DDTC
90/01/15	Ensotech, Inc.	DDTC	Safety, Health, and Emergency Response Plan (Draft) for DDTC
90/01/15	Ensotech, Inc.	DDTC	Site Specific Safety Plan, Groundwater Remediation (Draft) for DDTC
90/01/23	Ensotech, Inc.	DDTC	Preliminary Draft Groundwater Model Report
90/01/24	AEPCO	CEHND	Draft Investigation Plan Industrial Process System Assessment & Process Alternatives Evaluation at Defense Depot Tracy
90/01/24	DDTC-WB	CoE	Request for review of the abandoned well sites.
90/01/25	Ensotech, Inc.	DDTC	Permits Status Report for Interim Groundwater Remediation at DDTC
90/01/25	Ensotech, Inc.	DDTC	Equipment Submittal Data (Draft) for Interim Groundwater Remediation at Tracy Defense Depot, San Joaquin County, California
90/02/06	DDTC-WB	CoE	DDTC's comments on the documents from Ensotech, Inc.
90/02/21	Ensotech, Inc.	DDTC	Rationale for Monitoring Well Placement at DDTC.

Date	Author	Addressee	Subject
90/02/22	SSTC-WB	CoE	DDTC's comments on the AEPCO, Inc., Draft Investigation Plan.
90/02/22	Ensotech, Inc.	DDTC	Addendum to Work Plan
90/02/28	CoE	AEPCO, Inc.	COE comments on the DDTC Process Evaluation
90/02/28	CoE	Ensotech, Inc.	CoE comments on the Groundwater Treatment System.
90/03/02	DDTC-WB	CoE	DDTC comments on the Addendum to Work Plan, interim Groundwater Withdrawal, Treatment, and Disposal System and Rationale for Monitoring Well Placement Report.
90/03/08	Ensotech, Inc.	DDTC	Rev 1 Safety, Health, and Emergency Response Plan for Defense Depot Tracy
90/03/22	Ensotech, Inc.	DDTC	Preventative Maintenance Schedule for Interim Groundwater Remediation at DDTC
90/03/24	Ensotech, Inc.	DDTC	Preliminary Groundwater Model Report, DDTC
90/04/01	DDRW		Interim Remedial Action Plan for DDTC
90/04/04	DDTC-WB	RWQCB	Copy of the Draft Investigation Plan Industrial Process System Assessment and Process Alternatives Evaluations.
90/04/05	Ensotech, Inc.	DDTC	Topographic Site Survey for interim Groundwater Remedation at DDTC
90/04/06	DDTC-WB	CoE	DDTC comments on the Abandoned Water Well Evaluation Project.
90/04/18	DHS	DHS	Formal agreement between Region 1 Permitting and Site Mitigation for the Site Mitigation Units (SMU) to oversee characterization and remediation activities.
90/05/04	DDTC-WB	RWQCB	Request for review and approval of the Solid Waste Management Units Investigation Plan.
90/05/04	DDTC-WB	DHS	Request for review and approval of the Solid Waste Management Units Investigation Plan.
90/05/10	CoE	AEPCO, Inc.	CoE comments on the Point Source Evaluation Investigation Plan.
90/05/17	Aepco, Inc.	DDTC	Final Investigation Plan (Rev 01) Industrial Process System Assessment and Process Alternatives Defense Depot Tracy, California
90/05/25	DDTC-WB	RWQCB	Request review of WCC's Work Plan, Task 33, Soil Boring, and Task 37, Groundwater Monitoring Wells.
90/05/25	DDTC-WB	DHS	Request review of WCC's Work Plan, Task 33, Soil Boring, and Task 37, Groundwater Monitoring Wells.
90/05/31	DDTC-WB	DHS	Copy of the draft Scope of Work for the DDTC Well Monitoring Program.
90/05/31	DDTC-WB	DHS	Request review of the Abandoned Water Well Evaluation and Underground Storage Tank Investigation and Study.
90/06/08	DDTC-WB	CoE	DDTC comments on the Statement of Work for the Abandoned Well Evaluation and Draft Underground Storage Tank Investigation and Study
90/06/15	Ensotech, Inc.	DDTC	Final Safety, Health, and Emergency Response Plan for Defense Depot Tracy
90/06/15	RWQCB	DDTC-WB	RWQCB comments on the draft Scope of Work for the regular monitoring to tile RI/FS wells.
90/06/26	DDRW-WB	EPA	Letter submitting minutes for the Project Managers Meeting held 4-5 June 1991.
90/07/02	RWQCB	DDTC-WB	RWQCB comments on the proposed Statement of Work underground tank and abandoned waterwell investigations.
90/07/10	DDRW-DE	RWQCB	Request review of the Solid Waste Management Unit RI/FS Statement of Work.
90/07/12	Ensotech, Inc.	DDTC	Design Calculations for Interim Groundwater Remediation at DDTC
90/07/16	DDRW-DE	CoE	Request CoE increase the sampling requirements on a quarterly basis (Well Monitoring Program).

Date	Author	Addressee	Subject
90/07/18	DDRW-DE	DHS	DHS comments on WCC's risk assessment portion of the RI/FS.
90/07/23	DDRW-DE	DHS	DHS comments on WCC's RI/FS risk assessment.
90/07/24	Ensotech, Inc.	DDRW-WB	Notification that the air stripping tower will be shipped to the depot on 24 July 1990.
90/07/24	RWQCB	DDRW-DE	Notification that the Statement of Work for the remediation of the underground storage tank site appeared satisfactory.
90/08/01	DDRW-DE	DHS	Copy of the internal audit on the monitoring well drilling operations.
90/08/01	DHS	DDRW-DE	DHS comments on the risk assessment of the draft RI/FS engineering report.
90/08/01	DHS	DDRW-DE	Acceptance of technical responses and submittal of a schedule for the Interim Groundwater Treatment System.
90/08/01	Nakata Plan Grp, Inc.	DDTC	Concept Development Report, DDTC
90/08/02	CoE	Ensotech, Inc.	Letter notifying Enotech that the vapor control unit does not meet the terms of the contract.
90/08/07	DDRW-DE	CoE	Comments from DHS on the RI/FS Study Risk Assessment.
90/08/07	DDRW-DE	CoE	Letter transmitting a copy of tile waste discharge requirements for the IRM as proposed by RWQCB.
90/08/09	DDRW-DE	CoE	Documents regarding the late revision for the IRM Waste Discharge Permit.
90/08/14	CoE	Ensotech, Inc.	Notice of failure to comply with contract requirements.
90/08/31	RWQCB	DDRW-WB	Letter approving the revised statement of work for the monitoring well sampling program.
90/09/27	CoE	WCC	Change in laboratory, revised schedule, and internal audits for RI/FS.
90/09/27	COE	Ensotech, Inc.	Letter requesting that the addendum to the "Authority to Construct" permit application for the IRM be received by 22 August 1990.
90/09/28	CoE	Ensotech, Inc.	CoE comments on the document submittals for the interim groundwater withdrawal, treatment, and disposal system.
90/09/28	DDRW-DE	CoE	DDRW requesting a response for a firm start date on the construction of the IRM.
90/09/28	DDRW-DE	DHS	Letter requesting a response for a firm start date on the construction of the IRM.
90/10/09	CoE	DDRW-WB	CoE responding to DDRW-WB's letter dated 28 September 1990.
90/10/23	CoE	Ensotech, Inc.	CoE review comments on the permit application for construction of the air stripping tower and vapor control unit.
90/11/01	Golden West Builders	DDRW	DDRW Building 201 Contract/Scope of Work
90/11/14	DDRW-DE	RWQCB	Request review of the Draft Work Plan for Investigation of Solid Waste Management Units and Work Plans for the Well Monitoring Program.
90/11/14	DDRW-DE	DHS	Request review of the Draft Work Plan for Investigation of Solid Waste Management Units and Work Plans For tile Well
90/11/26	CoE	Ensotech, Inc.	CoE comments on the document submittals for the interim groundwater for the interim groundwater withdrawal, treatment, and disposal system.(cill,
90/11/27	CoE	AEPCO, Inc.	Request disposition of comments and incorporation of changes in the final report.
90/12/11	Ensotech, Inc.	DDTC	Application for Authority to Construct and Permit to Operate Air Stripping Tower and GAC Vapor Control Units to Cleanup TCE and PCE Contaminated Groundwater
90/12/13	DDRW-DE	CoE	Letter requesting that Mr. Marshall Cloud he replaced as tile contracting officers representative for the IRM.

Date	Author	Addressee	Subject
90/12/27	DDRW-DE	CoE	DDRW comment to the Industrial Process System Assessment and Process Alternatives Evaluation Final Investigation Plan.
91/01/16	CoE	DDRW-DE	Request for a technical report which documents the work completed under the COE purchase order.
91/01/16	CoE	DDRW-WB	Letter recommending that DDRW request permission to proceed with the well monitoring and solid waste management unit programs with regulatory comment.
91/01/25	RWQCB	DDRW-DE	Comments on the Solid Waste Management Unit and Well Monitoring Work Plans
91/01/25	RWQCB	RWQCB	Comments on the work plan for the Well Monitoring Program
91/01/25	RWQCB/DTSC	RWQCB/DTSC	Comments on the Work Plan for Well Monitoring Program.
91/01/28	CoE	WCC	CoE comments on the Preliminary Draft RI/FS Report.
91/01/29	CoE	DDRW-DE	Letter clarifying the relationship between the well monitoring program and monitoring for the IRM.
91/01/29	EPA	DDRW-DE	EPA comments on the Draft Work Plan for Investigation for solid waste management units.
91/01/31	Aepco, Inc.	DDRW	Alternatives Evaluation/Implementation Report, Industrial Process System Assessment and Process Alternatives Evaluation at DDRW, Tracy, California
91/01/31	DHS	DDRW-DE	Comments on the Draft Work Plans for the Solid Waste Management Units.
91/02/01	WCC	DDRW	Final Work Plan for Investigation of Solid Waste Management Units at Defense Distribution Region West, Tracy, California
91/02/05	DDRW-WB	CoE	CoE comments on the Preliminary Draft RI/FS Report.
91/02/05	EPA	CoE	EPA comments on the Work Plans for the Well Monitoring Program
91/02/06	DDRW-DE	DHS	Copy of Volume II of the Well Monitoring Plan.
91/02/06	WCC	DDRW	Vol I and II, Work Plan for the Well Monitoring Program at Defense Distribution Region West, Tracy
91/02/11	DDRW-WB	DHS	Copy of the final Alternatives Evaluation/Implementation Report.
91/02/11	DDRW-WB	RWQCB	Copy of the final Alternatives Evaluation/Implementation Report.
91/02/11	DDRW-WB	EPA	Copy of the final Alternatives Evaluation/Implementation Report.
91/02/13	EPA	DDRW-WB	EPA comments on the draft scope of work for UST Investigation and Study.
91/02/15	DDRW-WB	EPA	Copy of the Work Plan for the Well Monitoring Program and Final Work Plan for Investigation of Solid Waste Management Units.
91/02/15	DDRW-WB	RWQCB	Copy of the Work Plan for the Well Monitoring Program and Final Work Plan for Investigation of Solid Waste Management Units.
91/02/15	DDRW-WB	DHS	Copy of the Work Plan for the Well Monitoring Program and Final Work Plan for Investigation of Solid Waste Management Units.
91/02/22	EPA	DDRW-WB	EPA comments on the draft scope of work for the Abandoned Waterwell Evaluation.
91/02/25	Ensotech, Inc.	DDRW	Geologic Well Logs (Draft) for Interim Groundwater Remediation at Tracy Defense Depot, San Joaquin County, California
91/02/28	DDRW-WB	EPA	Copy of the Installation Assessment of Defense Depot Tracy and Pre-Survey Instructions for Installation Assessment.
91/03/01	DDRW-WB	DHS	Two copies of the Draft RI/FS Report.

Date	Author	Addressee	Subject
91/03/01	DDRW-WB	EPA	Two copies of the RI/FS Report.
91/03/01	DDRW-WB	CoE	DDRW informing CoE of their difficulties with Ensotech, Inc., tile prime contractor for the air stripper project.
91/03/11	DDRW-WB	ATSDR	Two copies of the Draft RI/FS Report.
91/03/12	DDRW-WB	EPA	Information submitted as requested by EPA's letter dated 28 February 1991.
91/03/15	GWESBGC	DDRW	Remediation Status Report, DDRW Building 201 Underground Tank Site Remediation
91/03/18	EPA	DDRW-WB	EPA comments on the Community Relations Plan.
91/03/25	DDRW-WB	EPA	DDRW response to EPA, RQWCB, and DHS comments regarding the Well Monitoring Program, Solid Waste Management Units, and Abandoned Well Project and Underground Storage Tanks.
91/03/29	CoE	DTSC	Letter addressing comments received by DTSC, RWQCB, and EPA.
91/04/01	DDRW-WB	CoE	Copy of the signed Building 201 UST Contract.
91/04/02	Ensotech, Inc.	DDRW	Installation Data Report for Interim Groundwater Remediation at Tracy Defense Depot, Tracy, California
91/04/05	Ensotech, Inc.	DDTC	Start-Up Schedule for Interim Groundwater Remediation at DDTC
91/04/01	DDRW-WB	CoE	DDRW comments on the Statement of Work for Building 201 soil treatment/disposal.
91/05/06	RWQCB	DDRW-WB	Letter indicating those wells which should be measured monthly for groundwater elevations for a period of one year.
91/05/17	Ensotech, Inc.	DDRW	Report on Prove-Out of Interim Groundwater Remediation System at Tracy Defense Depot, Tracy, California
91/05/22	EPA	CoE	EPA comments concerning the Draft RI/RS Report.
91/05/23	EPA	DDRW-WB	EPA input concerning the selection of monitoring wells to be used to measure monthly groundwater levels.
91/05/27	Ensotech, Inc.	DDRW	Site Specific Quality Management Plan (SSQMP) for Interim Groundwater Treatment System at Tracy Defense Depot, San Joaquin County, California
91/05/29	DDRW-WB	CoE	DDRW comments on the Installation Data Report for Groundwater Remediation.
91/05/29	DDRW-WB	RWQCB	Letter informing RWQCB of the intent to begin sampling for the well monitoring program.
91/05/29	DDRW-WB	CoE	DDRW comments on the Installation Data Report.
91/05/31	DHS	DDRW-WB	DHS comments on the Draft RI/FS Report.
91/06/04	Ensotech, Inc.	DDRW	Drill Cuttings Disposal Report for Interim Groundwater Remediation System at DDTC
91/06/10	DDRW-WB	CoE	DDRW comments on the Prove-Out of Interim Groundwater Remediation System Report.
91/06/19	DDRW-WB	CoE	DDRW review comments for the Drill Cuttings disposal report and the Site Specific Quality Management Plan.
91/06/21	DDRW-WB	CoE	DDRW notifying CoE of deficiencies in the construction of the IRM.
91/06/24	DDRW-WB	CoE	Notification of the existence of a Federal Facilities Agreement between the regulatory agencies and DDRW.
91/06/27	RWQCB	CoE	RWQCB comments on the Statement of Work for the RI/FS Work Plan.
91/07/05	RWQCB	DDRW-WB	RWQCB comments on the RI/FS Report.
91/07/09	DDRW-WB	EPA	Letter notifying EPA of the intent to issue a press release which details the signing of the FFA.
91/07/11	CoE	RWQCB	Letter presenting a proposed plan for completion of the RI/FS for OU-1.
91/07/18	CoE	Ensotech, Inc.	Letter notifying the contractor of deficiencies in the installation of the interim groundwater withdrawal and disposal system.
91/07/18	DDRW-WB	EPA	Letter submitting copies of the publication notices soliciting public comment on the Federal Facility Agreement.

Date	Author	Addressee	Subject
91/07/19	DDRW-WB	CoE	DDRW comments for the Installation Data Report and the Prove-Out Report.
91/07/22	EPA	DDRW-WB	Letter delineating the US EPA's concerns regarding the location of the proposed Subsistence Warehouse.
91/07/24	EPA	DDRW-WB	EPA's response to DDRW's letters of 18 July 1991 and 22 July 1991.
91/07/29	CoE	DDRW-DE	Letter proposing deadlines for the Federal Facility Agreement at DDRW.
91/07/30	DDRW-WB	CoE	Request that monitoring wells 2F-89-25 and 2F-89-26 not be destroyed because of the location of several old SWMUs in proximity to the new Subsistence Warehouse.
91/07/31	RWQCB	DDRW-WB	Letter requesting that DDRW investigate options and take actions to discontinue the use of the agricultural supply wells and to replace the water supply for those well owners.
91/08/02	RWQCB	DDRW-WB	RWQCB requesting a 30-day extension for the review of the Draft Solid Waste Management Unit Engineering Report.
91/08/09	DDRW-WB	RWQCB	Letter proposing document delivery dates and a press release of the document deadlines.
91/08/09	DDRW-WB	EPA	Letter proposing document delivery dates and a copy of the public notice to be published in the Tracy Press and Stockton Record regarding
91/08/09	DDRW-WB	DHS	Letter proposing primary document deadlines.
91/08/13	WCC	DDRW	Draft Quarterly Groundwater Monitoring Program, May 1991, for the Well Monitoring Program at Defense Distribution Region West, Tracy, California
91/08/15	EPA	DDRW-WB	EPA's preliminary comments on the investigative effort at DDRW Tracy's Subsistence Warehouse.
91/08/19	DDRW-WB	EPA	Letter informing EPA of the discovery of an old buried pit at the Subsistence Warehouse construction site.
91/08/19	DDRW-WB	DTSC	Letter informing DTSC of the discovery of several old buried 55-gallon drums and numerous old burn pits in the Subsistence Warehouse construction site.
91/08/20	EPA	DDRW-WB	EPA comments on the proposed schedule for draft primary documents.
91/08/21	DDRW-WB	RWQCB	Letter requesting RWQCB's review and comment on the Draft Quarterly Groundwater Monitoring Report.
91/08/21	DDRW-WB	CoE	DDRW review comments on the DDRW-Tracy Subsistence Warehouse Scope of Work (SOW).
91/08/21	EPA	DDRW-WB	EPA comments on the Scope of Work for the Subsistence Warehouse removal action.
91/08/23	DDRW-WB	CoE	Correspondence regarding the funding for the replacement of the Raspo agricultural wells.
91/08/23	DTSC	DDRW-WB	DTSC comments of the SOW for the Subsistence Warehouse Construction Site.
91/08/23	RWQCB	DDRW-WB	RWQCB comments on the Draft Investigation and Remediation Plan.
91/08/24	DDRW-WB	EPA	DDRW requesting EPA review the preliminary sampling results from the Subsistence Warehouse construction site.
91/08/26	DDRW-WB	EPA	DDRW requesting permission to release stockpiled excavation soils for other construction purposes.
91/08/26	DDRW-WB	CoE	Notification that DDRW is officially releasing the Subsistence Warehouse stockpiled soils from restriction.
91/08/26	EPA	DDRW-WB	Letter agreeing with DDRW-WB's letter that the stockpiled soils from the Subsistence Warehouse do not represent an imminent threat to human health and the environment.
91/08/26	RWQCB	DDRW-WB	RWQCB comments on the Proposed Plan for the completion of the RI/FS for OU-1.
91/08/29	DDRW-WB	EPA	Letter transmitting the SOW for the rapid characterization and cleanup of the Subsistence Warehouse construction site.

Date	Author	Addressee	Subject
91/08/29	RWQCB	DDRW-WB	RWQCB comments on the IRM Prove-Out Phase Reports.
91/08/30	DDRW-WB	RWQCB	Letter requesting the Raspo agricultural wells be made an agenda item for the upcoming project manager's meeting.
91/09/01	EPA	DDRW	Aerial Photographic Analysis of DDRW Tracy
91/09/03	DDRW-WB	CoE	DDRW review comments on the Quarterly Groundwater Monitoring Report.
91/09/04	DDRW-WB	DTSC	DDRW's proposed schedule change for the draft primary documents.
91/09/05	DDRW-WB	DLA-WE	An informational letter regarding the Subsistence Warehouse cleanup.
91/09/09	EPA	DDRW-WB	EPA comments on the Draft SWMU Engineering Report.
91/09/10	RWQCB	DDRW-WB	RWQCB comments on the Draft Solid Waste Management Unit Engineering Report.
91/09/12	DDRW-WB	RWQCB	DDRW's response to RWQCB letter dated 31 July 1991.
91/09/12	DDRW-WB	Resident	Response to documents requested during meeting held 5 September 1991.
91/09/12	DTSC	DDRW-WB	DTSC comments on the Solid Waste Management Unit Engineering Report.
91/09/16	CoE	Ensotech, Inc.	Approval to proceed with full-scale operation of the groundwater withdrawal, treatment, and disposal system.
91/09/17	DDRW-WB	RWQCB	Letter concerning the offsite contamination of crops and agricultural supply wells.
91/09/18	CoE	WCC	CoE comments to the Draft Quarterly Monitoring Report Number 1 for the Well Monitoring Program.
91/09/18	DDRW-WB	EPA	Notification that the public comment period for the FFA expired and DDRW had received no comments.
91/09/18	DDRW-WB	DTSC	Letter regarding the public comment period for the Federal Facility Agreement.
91/09/18	DDRW-WB	CoE	Notification that the public comment period for the Federal Facility Agreement has expired and there were no comments received.
91/09/19	DDRW-WB	CoE	DDRW review comments for Telic Engineering Corporation Draft Subsistence Warehouse Report.
91/09/24	DTSC	DDRW-WB	DTSC comments on the prove-out reports for the groundwater treatment plant.
91/09/26	CoE	DDRW-WB	Letter regarding the excavation and testing at the Consolidated Subsistence Facility.
91/10/01	DDRW		Final Defense Distribution Region West, Environmental Program, Community Relations Plan, 1991
91/10/01	Unknown	DDRW-Tracy	Community Relations Plan
91/10/07	DDRW-WB	CoE	Request that CoE send the RWQCB and DTSC appropriate number of copies of all SOWs and reports for the Building 201 site characterization.
91/10/10	DDRW-WB	CoE	DDRW notifying CoE off their concerns with the start-up of the air stripper by Ensotech, Inc.
91/10/16	DDRW-WB	DTSC	Letter requesting, DTSC provide a list of all ARARs which might affect development of the Operable Unit One Draft Feasibility Study.
91/10/16	DDRW-WB	CoE	DDRW notifying CoE of the IRM failure on 12 October 1991.
91/10/I7	DDRW-WB	CoE	Letter responding to an inquiry regarding the Raspo property easement.
91/10/17	DDRW-WB	DTSC	Letter notifying DTSC of all equipment failure which resulted in a spill of TCE/PCE contaminated water at the IRM.
91/10/18	DTSC	DDRW-WB	DTSC comments and recommendations regarding the RI/FS activities at DDRW Tracy
9l/10/2l	EPA	DDRW-WB	EPA comments on the Draft Quarterly Groundwater Monitoring (May 1991) Report.
91/10/23	DDRW-WB	EPA	Letter transmitting minutes of the Project Manager's Meeting held 10-11 October 1991.

Date	Author	Addressee	Subject
91/10/24	DRW-WB	CoE	Letter transmitting photographs of the IRM during the time of the spill.
91/10/26	Telic Engineering, Corporation	DDRW	Project Summary Report, DDRW Tracy, subsistence Warehouse
91/10/29	DDRW-WB	Resident	Letter requesting permission to collect water samples from private wells which might be in the flow path of the contaminants.
91/10/29	DDRW-WB	Resident	Letter requesting permission to collect water samples from private wells which might be in the flow path of the contaminants.
91/10/29	DDRW-WB	DTSC	Letter transmitting the Subsistence Warehouse Removal Action Summary Report for informational purposes.
91/10/29	DTSC	DDRW-WB	DTSC requiring DDRW to prepare a report for regulatory review regarding the inadequacies of the air stripper.
91/10/30	WCC	CoE	Draft Letter Report (Response to Comments and Outline of Remaining Work) for the DDRW Tracy OU#1 RI/FS
91/10/31	WCC	CoE	WCC's minutes for the Project Manager's Meeting held 10-11 October 1991.
91/11/01	DDRW-WB	CoE	Notification that the air stripper now has all outside telephone line.
91/11/01	IT Corp.	DDRW	Soil Treatment/Disposal, Building 201, DDRW Tracy
91/11/06	DDRW-WB	EPA	WCC's minutes from the Project Manager's meeting held 10-11 October 1991.
91/11/11	WCC	DDRW	Quarterly Monitoring Report of May 1991 Sampling Round for Well Monitoring Program at DDRW Tracy
91/11/11	WCC	DDRW	Quarterly Monitoring Report of August 1991 Sampling Round for Well Monitoring Program at DDRW Tracy
91/11/15	DDRW-WB	CoE	Letter requesting the IRM startup be rescheduled.
91/11/15	EPA	DDRW-WB	EPA comments on the Draft Work Plan for Well Evaluation and Abandonment.
91/11/19	DDRW-WB	RWQCB	Letter transmitting the minutes for the Project Manager's Meeting held on 14 November 1991.
91/11/19	EPA	DDRW-WB	This letter documents EPA's approval of the revised Federal Facility Agreement schedule submitted on 10 September 1991.
91/11/20	DDRW-WB	CoE	DDRW requesting that a cure notice be issued to the contractor because of its failure to operate the IRM.
91/11/20	DDRW-WB	Resident	Letter transmitting the laboratory results for the water samples taken from his well on 6 and 14 November 1991.
91/11/20	PHS, SJC	DDRW-WB	Letter expressing concerns relative to the recent confirmation of contamination in off-site domestic drinking water wells.
91/11/22	RWQCB	DDRW-WB	Request that DDRW Tracy submit a time schedule for development of a long term alternative water supply for those domestic wells impacted by groundwater contamination.
91/11/26	DTSC	DDRW-WR	Recommendations regarding groundwater contamination at off-site residences near DDRW.
91/11/26	EPA	DDRW-WB	EPA comments on the Draft Minutes of the Project Manager Meeting held 10-11 October 1991.
91/11/27	DTSC	DDRW-WB	DTSC recommending that DDRW provide an alternative drinking water supply to any resident impacted and conduct an offsite well survey for a one-mile distance from DDRW.
91/12/01	WCC	DDRW	Final Solid Waste Management Unit Engineering Report, DDRW, Tracy
91/12/01	WCC	DDRW	Comprehensive RI/FS Work Plan, DDRW Tracy
91/12/02	DTSC	DDRW-BE	DTSC approving DDRW's request for all extension of the delivery date for the OU-1 Draft Final FS and Proposed Plan.

Date	Author	Addressee	Subject
91/12/03	DDRW-WB	Resident	Letter transmitting the laboratory test results for the water samples taken from his well on 6 and 4 November 1991
91/12/04	CoE	DHS	Letter requesting concurrence regarding the use of bioremediation as the method of treatment for the soil from Building 201.
91/12/04	Ensotech, Inc.	DDRW	Monthly Operation Report, Interim Groundwater Remediation System, DDRW Tracy
91/12/05	CoE	Ensotech, Inc,	Notice to discontinue work on the interim groundwater treatment system.
91/12/06	EPA	DDRW-WB	EPA review comments on EPA EMSL's aerial photography analyses.
91/12/10	DDRW-WB	CoE	DDRW review comments on the Telic Engineering Company's Project Summary Report for the Subsistence Warehouse construction project.
91/12/13	DDRW-WB	EPA	Notification that DDRW is providing bottled water to two residents near DDRW.
91/12/13	DDRW-WB	RWQCB	Notification that DDRW is providing bottled water to two residents near DDRW.
91/12/13	EPA	DDRW-WB	EPA comments on RI/FS for OU-1/
91/12/16	DDRW-WB	CoE	Letter requesting 2 copies of the Oracle Database User Instruction Manual and review the possibility of adding sampling of all IRM wells to the existing contract.
91/12/16	RWQCB	DDRW-WB	RWQCB comments and concerns with the Draft Work Plan for Well Evaluation and Abandonment.
91/12/19	DTSC	DDRW-WB	DTSC comments of the Draft Work Plan for Well Evaluation and Abandonment.
91/12/19	EPA	DDRW-WB	EPA review comments on the Draft Quarterly Monitoring Report of the August 1991 Sampling Round for the Well Monitoring Program.
91/12/20	DDRW-WB	CoE	DDRW comments on the Draft Work Plan for Well Evaluation and Abandonment.
91/12/30	Ensotech, Inc.	CoE	Ensotech's response to CoE's letter dated 18 December 1991.
92/01/01	IT Corp.	DDRW	Remedial Action at Building 201, DDRW Tracy
92/01/02	GWESBGC	DDRW	Remediation Status Report, DDRW Building 201 Underground Tank Site Remediation
92/01/06	DDRW-WB	CoE	Letter directing the CoE, Huntsville Division, to proceed with the termination for default process on the IRM unit.
92/01/06	DDRW-WB	EPA	Letter informing EPA that bioremediation is the selected treatment method for diesel contaminated soils from the Building 201 site.
92/01/16	CoE	Ensotech, Inc.	CoE notifying Ensotech of their failures to perform in accordance with the contract.
92/01/16	DTSC	DDRW-WB	DTSC letter expressing concern regarding the expansion of DDRW Tracy's groundwater contamination.
92/01/16	DTSC	DDRW-WB	Notification that the groundwater treatment system restoration report submitted was insufficient and requested that the report be resubmitted.
92/01/17	DDRW-D	CoE	Letter urging the CoE to default the interim remedial measure unit contractor because of their failure to get the system operational.
92/01/20	Ensotech, Inc.	CoE	Ensotech's response to CoE's letter dated 19 December 1991.
92/01/21	EPA	DDRW-WB	Letter submitting a draft analysis of potential Federal ARARs for the RI/FS for OU-1.
92/01/22	EPA	DDRW-WB	Summary of the meeting of 16 December 1991 regarding chemicals of concern for OU-1 RI/FS.
92/01/23	EPA	DDRW-WB	EPA review comments on the Final May 1991 Quarterly Monitoring Report.

Date	Author	Addressee	Subject
92/01/24	EPA	DDRW-WB	Letter submitting guidance for the natural resource damage assessment.
92/01/24	Resident	DDRW-D	Letter requesting status on the contamination located on his property.
92/01/30	DDRW-WB	EPA	Letter requesting EPA determine the necessity of performing a Natural Resources Damage Assessment at DDRW Tracy.
92/01/30	DDRW-WB	Deputy Secretary, Resources Agency	Letter requesting the Resources Agency determine the necessity of performing a Natural Resources Damage Assessment at DDRW Tracy.
92/01/30	DDRW-WB	Ofe of Env Proj Rev	Letter requesting this office determine the necessity of performing a Natural Resources Damage Assessment at DDRW Tracy.
92/01/31	RWQCB	DDRW-WB	RWQCB comments for the work plan for Remedial Action at Building 201.
92/02/01	IT Corp.	DDRW	Treatment/Disposal Alternatives Report, Soil Treatment/Disposal for Building 201, DDRW Tracy
92/02/01	WCC	DDRW	Final Work Plan for Well Evaluation and Abandonment at DDRW Tracy
92/02/05	DDRW-D	Resident	Response to Mr. Raspo's letter dated 24 January 1992.
92/02/05	EPA	DDRW-WB	EPA comments on the Risk Assessment and the Overall RI/FS Work Plan.
92/02/06	DDRW-WB	EPA	Letter requesting an extension for submittal of the Draft RI Report for Operable Unit #1.
92/02/10	WCC	CoE	Letter requesting a 17 day extension of the deadline for the Third Quarterly Monitoring Report.
92/02/13	EPA	DDRW-WB	Letter approving DDRW's request for a 36-day extension on the Draft RI Report.
92/02/19	WCC	CoE	Request for a schedule extension for the Draft Abandoned Waterwell Evaluation Report.
92/02/20	WCC	CoE	Notification of the need to resample the five domestic wells sampled in December 1991.
92/02/24	DDRW-WB	EPA	Letter requesting an extension of the submittal date deadline for the Draft Abandoned Waterwell Evaluation Report.
92/02/28	DDRW-WB	EPA	Letter requesting 91 additional days for the Draft Abandoned Waterwell Evaluation Report.
92/02/28	DDRW-WB	DTSC	Request for an additional 91 days to review the Draft Abandoned Waterwell Evaluation Report.
92/02/28	RWQCB	DDRW-WB	Letter transmitting information regarding ARARs for Operable Unit 1.
92/02/28	WCC	DDRW	Quarterly Monitoring Report of the November 1991 Sampling Round for the Well Monitoring Program at Defense Distribution Region West -
92/03/01	IT Corp.	DDRW	Technical Work Plan Remedial Action at Building 201, Defense Distribution Region West, Tracy, California
92/03/05	DDRW-WB	EPA	Submittal of the minutes for the Project Manager's Meeting held 26-27 February 1992.
92/03/05	DDRW-WB	CoE	DDRW comments for the Treatment/Disposal Alternatives Report Soil Treatment/Disposal for Building 201.
92/03/06	WCC	CoE	Letter transmitting a tentative list of the 26 wells recommended for sampling and analysis.
92/03/09	WCC	CoE	WCC minutes for the Project Manager's Meeting held 26-27 February 1992.
92/03/11	DDRW-WB	Residents	Letter requesting permission to sample his private domestic well.
92/03/11	USAMC	DLA	Letter endorsing the request for the acquisition of agricultural land adjacent to DDRW.
92/03/12	DDRW-WB	Resident	Letter requesting permission to sample his private domestic well.
92/03/12	DDRW-WB	Resident	Letter requesting permission to sample his private domestic well.
92/03/12	DDRW-WB	Resident	Letter requesting permission to sample his private domestic well.
92/03/12	DDRW-WB	Resident	Letter requesting permission to sample his private domestic well.

Date	Author	Addressee	Subject
92/03/13	WCC	CoE	Letter transmitting the final list of the 26 wells to be sampled and analyzed.
92/03/16	WCC	ETCC	Notification of the intent to commence with the collection of groundwater samples from 26 on-site monitoring wells, water supply wells, and off-site private wells.
92/03/17	WCC	ETCC	Notification of the resampling of the five domestic wells initially samples on 30 December 1991.
92/03/19	RWQCB	DDRW-WB	RWQCB review comments for the Final Work Plan for Well Evaluation and Abandonment.
92/03/24	DDRW-WB	CoE	Letter addressing concerns of the Tracy Well Monitoring Well Delivery Order.
92/03/27	DDRW-WB	USDOI	Letter submitting a copy of Ecological Risk Assessment section of the Draft Operable Unit 1 for information purposes.
92/04/09	DDRW-WB	EPA	Letter transmitting the minutes from the telephone conference call that occurred on 23 March 1992.
92/04/13	DDRW-WB	EPA	Letter transmitting WCC's minutes for the Project Manager's Meeting held 20 March 1992.
92/04/17	DDRW-WIEP	DLA-WS	Response to AMCEN letter dated 11 March 1992 regarding the acquisition of agricultural land adjacent to DDRW.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from their domestic water well.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from his agricultural/domestic water wells.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from his domestic water well.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from his domestic water well.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from his domestic water well.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from her domestic water well.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from his domestic water well.
92/04/20	DDRW-WB	Resident	Letter requesting permission to collect a sample from his domestic water well.
92/04/21	DDRW-WB	CoE	DDRW's review comments for the Site Wide RI/FS Work Plan.
92/04/30	DDRW-WB	EPA	Letter requesting a seven day extension for the Draft Final Site Wide RI/FS Wolk Plan.
92/04/30	DDRW-WB	EPA	Letter requesting an extension for the Draft Abandoned Waterwell Evaluation Report.
92/04/30	DDRW-WB	RWQCB	Letter requesting an extension for the Draft Abandoned Waterwell, Evaluation Report.
92/04/30	DDRW-WB	DTSC	Letter requesting an extension for the Draft Abandoned Waterwell Evaluation Report.
92/04/30	DDRW-WB	RWQCB	Letter requesting a seven day extension of the document delivery date for the Draft Final Site Wide RI/FS Work Plan.
92/01/30	DDRW-WB	DTSC	Letter requesting a seven day extension of the document delivery date for the Draft Final Site Wide RI/FS Work Plan.
92/04/30	DTSC	DDRW-WB	Letter providing concurrence with the Final Well Abandonment Work Plan.
92/05/01	ESE, Inc.	DDRW	Comprehensive Quality Assurance Plan
92/05/01	IT Corporation	DDRW	US Army Corps of Engineers, Contract DACA87-91-D-0010, Draft Site Investigation Report, Building 201, Defense Distribution Region West
92/05/01	WCC	DDRW	Draft Final Comprehensive RI/FS Work Plan, Defense Distribution Region West
92/05/03	DDRW-WB	EPA	Submission of the Draft Site Investigation Report for regulatory review and comment.
92/05/04	DDRW-WB	DTSC	Submission of the Draft Site Investigation Report for regulatory review and comment.

Date	Author	Addressee	Subject
92/05/04	DDRW-WB	RWQCB	Submission of the Draft Site Investigation Report for regulatory review and comment.
92/05/05	DDRW-WB	DTSC	Letter transmitting the meeting minutes from the Project Manager's Meeting held 23-24 May 1992.
92/05/05	DDRW-WB	RWQCB	Letter transmitting the minutes from the Project Manager's Meeting held 23-24 May 1992.
92/05/05	DDRW-WB	EPA	Letter transmitting the minutes from the Project Manager's Meeting held 23-24 May 1992.
92/05/06	RWQCB	DDRW-BE	RWQCB comments on the SOW for the IRM and Well Monitoring Program.
92/05/09	DDRW-WB	CoE	DDRW review comments on the Draft Site Investigation 1 Report.
92/05/22	WCC	DDRW-WB	Quarterly Monitoring Report of the February 1992 Sampling Round for the Well Monitoring Program
92/06/01	WCC	DDRW	Draft Operable Unit No. 1 FS Report, DDRW-Tracy, California, Vol II
92/06/08	DDRW-WB	RWQCB	DDRW's response to EPA comments on the Draft Final Site Wide RI/FS Work Plan.
92/06/08	DDRW-WB	EPA	DDRW's response to EPA comments on the Draft Final Site Wide RI/FS Work Plan.
92/06/08	DDRW-WB	DTSC	DDRW's response to EPA comments on the Draft Final Site Wide RI/FS Work Plan.
92/06/09	DDRW-WB	RWQCB	Letter requesting an extension for the Site Wide Remedial Investigation/Feasibility Study Work Plan.
92/06/09	DDRW-WB	EPA	Letter requesting an extension for the Site Wide Remedial Investigation/Feasibility Study Work Plan.
92/06/09	DDRW-WB	DTSC	Letter requesting an extension for the Site Wide Remedial Investigation/Feasibility Study Work Plan.
92/06/09	WCC	CoE	Letter requesting for review and comment of the Draft Operable Unit #1 Proposed Plan for DDRW Tracy.
92/06/09	WCC	CoE	Defense Distribution Region West - Tracy, Proposed Plan for Contaminated Groundwater, Tracy, California, June 1992
92/06/17	DDRW-WB	CoE	Letter expressing displeasure With the Draft Operable Unit One (OU-1) Proposed Plan prepared by Woodward-Clyde Consultants.
92/06/25	DDRW-WB	DTSC	Letter agreeing with the regulatory agencies that the addendums to the Site Wide RI/FS Work Plan be made primary documents.
92/06/25	DDRW-WB	EPA	Letter agreeing with the regulatory agencies that the addendums to the Site Wide RI/FS Work Plan be made
92/06/25	DDRW-WB	RWQCB	Letter agreeing with the regulatory agencies that the addendums to the Site Wide RI/FS Work Plan be made primary documents.
92/06/26	DDRW-WB	DTSC	Letter requesting that EPA rescind its insistence on PRGs at this time.
92/06/26	DDRW-WB	RWQCB	Letter requesting that EPA rescind its insistence on PRGs at this time.
92/06/26	DDRW-WB	EPA	Letter requesting that EPA rescind its insistence on PRGs at this time.
92/06/26	DDRW-WB	CoE	DDRW directing CoE to withhold any further driller or field work progress payments on this project.
92/06/26	DDRW-WB	CoE	Request that Solid Waste Management Unit (SWMU) #13 data be used in the Draft Final Site Wide RI/FS Work Plan as agreed to during the Project Managers meeting,
92/06/29	DDRW-WB	CoE	Minutes for the Project Manager's meeting of 15-16 June 1992.
92/06/29	DDRW-WB	RWQCB	Minutes for the Project Manager's meeting of 15-16 June 1992.
92/06/29	DDRW-WB	DTSC	Minutes for the Project Manager's meeting of 15-16 June 1992.
92/06/29	DDRW-WB	EPA	Minutes for the Project Manager's meeting of 15-16 June 1992.
92/06/29	DDRW-WB	WCC	Minutes for the Project Manager's meeting of 15-16 June 1992.

Date	Author	Addressee	Subject
92/06/30	DDRW-WB	EPA	Letter transmitting the final report on the remediation effort at the Subsistence Warehouse construction site.
92/07/01	WCC	DDRW	Final Analytical Data Submittal for Well Evaluation and Abandonment at Defense Distribution Region West, Tracy, California
92/07/07	DDRW-WB	BCID	Letter soliciting the identification of ARARS for remediation of groundwater contamination.
92/07/07	DDRW-WB	ISWMB	Letter soliciting the identification of ARARs for remediation of groundwater contamination.
92/07/07	DDRW-WB	WSID	Letter soliciting the identification of ARARs for remediation of groundwater contamination.
92/07/07	DDRW-WB	DFG	Letter soliciting the identification of ARARs for remediation of groundwater contamination.
92/07/07	DDRW-WB	City of Tracy, Public Works Dept.	Letter soliciting the identification of ARARs for remediation of groundwater contamination.
92/07/31	DDRW-WB	EPA	Letter notifying the regulatory agencies how they intend to dispose of purge water and drill cuttings.
92/07/31	DDRW-WB	RWQCB	Letter notifying the regulatory agencies how they intend to dispose of purge water and drill cuttings.
92/07/31	DDRW-WB	DTSC	Letter notifying the regulatory agencies how they intend to dispose of purge water and drill cuttings.
92/07/31	EPA	DDRW-BE	Letter confirming the date of the dispute resolution meeting.
92/08/06	EPA	DDRW-BE	Notification of resolution of the dispute invoked by EPA regarding the Draft Final Comprehensive RI/FS Work Plan.
92/08/24	DDRW-WB	CoE	DDRW comments on the Post Treatment/Disposal Report Soil Treatment/Disposal for Defense Distribution Region West Tracy, California.
92/08/24	PHS, SJC	DDRW-WB	Letter regarding the investigation of off-site contamination of domestic wells.
92/08/27	DDRW-WB	CoE	DDRW review comments for the Operable Unit One Feasibility Study.
92/08/27	DDRW-WB	EPA	Resolution of dispute for DDRW Tracy Draft Final Comprehensive RI/FS Work Plan.
92/08/27	DDRW-WB	EPA	Letter transmitting the Treatment/Disposal Report Soil Treatment/Disposal for Defense Distribution Region West (DDRW) Tracy, California.
92/08/28	DDRW-WB	CoE	Replacement of ruptured gas line during the initial well excavation effort.
92/08/31	DDRW-WB	RWQCB	Letter notifying the regulatory agencies of the discovery of a tar-like petroleum based substance at DDRW Tracy.
92/08/31	DDRW-WB	EPA	Letter notifying the regulatory agencies of the discovery of a tar-like petroleum based substance found at DDRW Tracy.
92/08/31	DDRW-WB	DTSC	Letter notifying the regulatory agencies of the discovery of a tar-like petroleum based substance at DDRW Tracy.
92/09	Woodward-Clyde	CoE, Huntsville	Final Comprehensive RI/FS Work Plan.
92/09/02	DTSC	DDRW-BE	Letter notifying DDRW that DTSC considers the dispute to be resolved and the Draft Final RI/FS Work Plan to be approved.
92/09/04	DDRW-WB	RWQCB	Letter submitting a location map and laboratory results of the substance found in the new water line trench adjacent to the Subsistence Warehouse.
92/09/04	DDRW-WB	DTSC	Letter submitting a location map and laboratory results of the substance found in the new water line trench adjacent the Subsistence Warehouse.

Date	Author	Addressee	Subject
92/09/04	DDRW-WB	EPA	Letter submitting a location map and laboratory results of the substance found in the new water line trench adjacent to the Subsistence Warehouse.
92/09/08	Senator Johnston	DDRW-D	Letter urging DDRW to survey wells within a mile radius including sampling of identified wells along Banta Road, and schedule a community awareness forum.
92/09/10	DDRW-WB	CoE	Letter forwarding the minutes for the Project Manager's Meeting held 22-23 July 1992.
92/09/10	DDRW-WB	RWQCB	Letter forwarding the minutes for the Project Manager's Meeting held 22-23 July 1992.
92/09/10	DDRW-WB	DTSC	Letter forwarding the minutes for the Project Manager's Meeting held 22-23 July 1992.
92/09/10	DDRW-WB	EPA	Letter forwarding the minutes for the Project Manager's Meeting held 22-23 July 1992.
92/09/11	RWQCB	DDRW-BE	RWQCB comments on the Draft Engineering Report for the Well Monitoring Program.
92/09/18	DDRW-WB	EPA	Letter requesting an extension of the delivery date for the Site-Wide RI/FS.
92/09/18	DDRW-WB	DTSC	Letter requesting an extension of the delivery date for the Site-Wide RI/FS.
92/09/18	DDRW-WB	RWQCB	Letter requesting an extension of the delivery date for the Site-Wide RI/FS.
92/09/22	DDRW-WB	CoE	DDRW comments on the Draft Final OU-1 RI/RA.
92/10/01	DDRW-WB	EPA	Submission of the revised Federal Facilities Agreement schedule for review/approval.
92/10/01	DDRW-WB	DTSC	Submission of the revised Federal Facilities Agreement schedule for review/approval.
92/10/01	DDRW-WB	RWQCB	Submission of the revised Federal Facilities Agreement schedule for review/approval.
92/10/01	WCC	DDRW	Draft Final Operable Unit No. 1 FS Report, DDRW-Tracy, California
92/10/02	DDRW-BE	RWQCB	Letter transmitting the final minutes for the Project Managers meetings of 15-16 June and 22-23 July 1992.
92/10/02	DDRW-BE	EPA	Letter transmitting the final minutes for the Project Managers meetings of 15-16 June and 22-23 July 1992.
92/10/02	DDRW-BE	DTSC	Letter transmitting the final minutes for the Project Managers meetings of 15-16 June and 22-23 July 1992.
92/10/09	DDRW-BE	CoE	DDRW comments on the Operable Unit #1 and Proposed Plan Draft Final.
92/10/09	DDRW-BE	DTSC	Notification that DDRW is prepared to begin spreading the remaining soil from the Subsistence Warehouse on the DDRW Tracy Facility.
92/10/09	DDRW-BE	RWQCB	Notification that DDRW is prepared to begin spreading the remaining soil from the Subsistence Warehouse on the DDRW Tracy Facility.
92/10/09	DDRW-BE	EPA	Notification that DDRW is prepared to begin spreading the remaining soil from the Subsistence Warehouse on the DDRW Tracy Facility.
92/10/09	DDRW-BE	CoE	Letter requesting that CoE exercise Option 5 (reclassify the soil stockpile) of the Site Investigation Report.
92/10/09	DTSC	DDRW-BE	DTSC's review of detection limits for the Site Wide RI/FS Work Plan found no reportable anomalies other than those previously identified.
92/10/15	DDRW-BE	CoE	DDRW comments for the Final Analytical Data Report for Well Abandonment.
92/10/16	RWQCB	DDRW-BE	Letter requesting that DDRW Tracy provide a time schedule and work plan for discontinuing well use and conducting an alternative water supply evaluation.
92/10/26	DDRW-BE EPA	CoE	Letter requesting that San Joaquin County Public Health Services be added to the document distribution list.
92/10/28	DDRW-BE	CoE	Letter requesting CoE adds wells LM-112 and LM-113 to the well monitoring/RI/FS work effort.
92/10/28	DDRW-BE	EPA	Minutes for the Project Managers Meetings held 14 Oct. 92.

Date	Author	Addressee	Subject
92/11/01	IT Corp.	DDRW	Post Treatment/Disposal Report Soil Treatment/Disposal for Defense Distribution Region West, Tracy, California
92/11/01	WCC	DDRW	Final Operable Unit No. 11 RI/RA Report, DDRW-Tracy
92/11/01	WCC	DDRW	Final Well Evaluation and Abandonment Engineering Report, Defense Distribution Region West, Tracy, California
92/11/04	DDRW-BE	EPA	Submission of the revised FFA deadlines for the DDRW Tracy Facility IRP documents.
92/10/10	DDRW-BE	EPA	Letter requesting a 30 day delivery date extension to the finalization period of the Draft final FS and Proposed Plan for OU-1.
92/11/12	PHS,SJC	DDRW-D	Public Health Services comments to DDRW Tracy's letter dated 14 September 1992.
92/11/12	RWQCB	DDRW-BE	RWQCB comments on the Draft Final Feasibility Study Report and Proposed Plan for Operable Unit No. 1.
92/11/16	RWQCB	TEPC	Letter requesting premise access to monitoring wells to measure groundwater levels and to collect and analyze water quality samples.
92/11/19	EPA	DDRW-BE	EPA comments on the Proposed revisions to the FFA schedule.
92/11/23	EPA	DDRW-BE	EPA comments on minutes of meetings of October 14-15, 1992.
92/11/23	RWQCB	DTSC	RWQCB comments on DTSC's 22 Oct 92 review of the Draft Final Well Evaluation and Abandonment Engineering Report for DDRW Tracy.
92/11/24	DDRW-BE	EPA	DDRW requesting a position statement from EPA regarding the inclusion of PHS/EHD in the CERCLA process.
92/11/30	DDRW-BE	RWQCB	Letter submitting a time line for the accomplishment of the abandonment of the off-site agricultural wells.
92/11/30	DDRW-BE	EPA	DDRW Tracy requesting an additional 10-day delivery date extension of the finalization period of the Draft Final Proposed Plan and Feasibility Study for OU-1.
92/12/01	DDRW		Proposed Plan for Contaminated Groundwater Remedation of Operable Unit No. 1 at Defense Distribution Region West-Tracy
92/12/02	DTSC	DDRW-BE	DTSC approving DDRW's request for an extension of the delivery date for the OU-1 Draft Final FS and Proposed Plan
92/12/02	DTSC	DDRW-BE	DTSC approving the proposed changes in the FFA schedule.
92/12/02	EPA	DDRW-BE	EPA comments on the Comprehensive RI/FS Risk Assessment Statement of Work.
92/12/02	RWQCB	DDRW-BE	Letter submitting the well sample results for turbidity at DDRW Tracy.
92/12/03	EPA	DDRW-BE	EPA Comments on the ARARs Tables for the Draft Final FS for OU-1
92/12/04	EPA	DDRW-BE	EPA's position on the request of the San Joaquin County Public Health Services/Environmental Health Division to be included in the CERCLA process at DDRW-Tracy
92/12/04	EPA	DDRW-BE	EPA concurring with DDRW Tracy's request for an extension for revision/review of the Draft Final Feasibility Study for Operable Unit No. 1.
92/12/07	DDRW-BE	EPA	DDRW requesting review of the revised FFA schedule for DDRW Tracy.
92/12/08	DDRW-BE	RWQCB	Letter submitting the daily stratup/proveout reports for the Tracy IRM for the period of November 5-14, 1992.
92/12/10	DDRW-BE	PHS	DDRW's response to a letter from Public Health Services dated November 12, 1992.
92/12/10	PSR,Corp	DDRW	Transcript for DDRW Tracy Facility Community Meeting to Establish the Technical Review Committee (TRC)

Date	Author	Addressee	Subject
92/12/14	DDRW-BE	CoE	Letter submitting the test results from the RWQCB for the well monitoring program they are conducting at DDRW Tracy.
92/12/16	RWQCB	DDRW-BE	Letter submitting an inspection report and a memorandum on stockpiled soils from the Subsistence Warehouse.
92/12/17	DDRW-BE	EPA	Letter transmitting the final minutes for the Project Managers meeting held 14-15 October 1992.
92/12/24	EPA	DDRW-BE	Letter recommending an extension to the finalization process of the FFA schedule from 30 to 45 days.
93/01/01	JMM	DDRW	Final Groundwater Pilot Chemical Data Acquisition Plan
93/01/04	JMM	EPA	Minutes from the telephone conference (17 December 1992) on evaluation of detection limits for the Comprehensive Phase 1 Remedial Investigation.
93/01/11	DDRW-BE	WCC	DDRW Tracy furnishing WCC with a copy of the Proposal Plan Fact Sheet for the DDRW Tracy Operable Unit #1 Feasibility Study/Proposed Plan.
92/01/11	DDRW-BE	EPA	DDRW providing EPA with a list of the wells and sampling methods to be used for the upcoming sampling round.
93/01/11	DDRW-BE	RWQCB	DDRW requesting a variance to the Monitoring and Reporting Section of the Waste Discharge Requirement.
93/01/11	DDRW-BE	EPA	DDRW resubmitting a revised Federal Facilities Agreement Schedule for review and comment.
93/01/12	DDRW-BE	EPA	DDRW providing the regulatory agencies with a copy of the transcript for the public meeting held on 19 December 1992.
93/01/12	DTSC	DDRW-BE	DTSC confirming the agreements reached during a tele-conference held November 19, 1992.
93/01/14	PSR,Corp	DDRW	Transcript for DDRW Tracy Facility Community Meeting for the Operable Unit No. 1 Feasibility Study/Proposed Plan
93/01/17	RWQCB	DDRW-BE	Letter requesting DDRW complete a Report of Waste Discharge for the disposal of the treated groundwater from OU-1 by 15 Mar. 93.
93/01/19	EPA	DDRW-BE	Letter concurring with the revised Federal Agreement schedule.
93/01/25	DDRW-BE	SJVUAPCD	Letter requesting approval of its Application for Permit to Construct for the Tracy Facility air stripper.
93/01/27	EPA	DDRW-BE	EPA comments on the Risk Assessment and the Comprehensive RI/FS Work Plan.
93/01/28	DDRW-BE	CoE	Letter requesting CoE expedite the removal of the Subsistence Warehouse soil pile from the DDRW Tracy Facility.
93/01/28	SJFBF	DDRW-BE	Letter addressing the Proposed Plan for Contaminated Groundwater Remediation of Operable Unit No. 1 at Defense Distribution Region West - Tracy.
93/01/30	WCC	DDRW	Final Engineering Report for the Well Monitoring Program at Defense Distribution Region West - Tracy, Tracy, California
93/02/01	JMM	DDRW	Final Well Monitoring Program Quarterly Monitoring Report - September 1992 Sampling Round
93/02/02	DDRW-BE	SJFBF	DDRW's response to the San Joaquin Farm Bureau Federation's letter dated January 28, 1993.
93/02/02	DDRW-BE	EPA	Minutes for the Project Manager's meeting held January 13-14, 1993.
93/02/02	RWQCB	DDRW-BE	Notification that James Taylor will replace Camilla Williams as Project Manager for the DDRW Tracy project.
93/02/04	DDRW-BE	EPA	Minutes for the Project Manager's meeting held December 10, 19992.
93/02/04	JMM	DDRW	Groundwater Treatment Pilot Plant Monthly Operations Reports.

Date	Author	Addressee	Subject
93/02/08	DDRW-BE	CoE	DDRW Requesting CoE direct Woodward-Clyde Consultants review the ARARs for DDRW Tracy Operable Unit No. 1, for specificity.
93/02/11	SWRCB	DDRW-D	Notification that the DDRW Tracy Facility Operable Unit No. 1 Feasibility Study/Proposed Plan is acceptable.
93/02/22	DDRW-BE	EPA	Letter transmitting final minutes for the project Managers' meetings held on December 10, 1992 and January 13-14, 1993.
93/02/23	DDRW-BE	CoE	Letter requesting that CoE contact JMM and ensure that specific changes be made to the well monitoring numbering system.
93/03/03	DDRW-BE	CoE	DDRW requesting CoE direct MW to institute a numbering sequence for all air stripper extraction wells.
93/03/08	EPA	DDRW-BE	EPA providing DDRW with an updated copy of the Draft Preliminary Remediation Goals Table.
93/03/12	RWQCB	DDRW-BE	Letter addressing disposal of stockpiled soil excavated from the foundation of the Subsistence Warehouse.
93/03/17	EPA	DDRW-BE	Letter submitting contour maps based on MW's September 1992 quarterly monitoring round ay DDRW Tracy.
93/03/26	RWQCB	DDRW-BE	RWQCB comments on the list of wells and sampling methods to be used in the spring 1993 quarterly groundwater monitoring round.
93/03/29	DDRW-BE	CoE	Letter transmitting a copy of the waste discharge requirements for H.J. Heinz for information purposes.
93/03/29	RWQCB	DDRW-BE	RWQCB clarifying their person on the proposed rehabilitation program for the IRM system at DDRW Tracy.
93/03/29	RWQCB	DDRW-BE	Letter requesting DDRW complete a Report of Waste Discharge for the disposal of the treated groundwater from OU-1 in order to receive Waste Discharge Requirements.
93/04/01	MW	DDRW	Final Groundwater Treatment Pilot Plan System Start-up and Prove-out Report
93/04/08	DDRW-BE	TRC Members	Letter transmitting minutes from the Technical Review Committee (TRC) meeting held 23 March 1993.
93/04/08	DDRW-BE	CoE	Letter transmitting a soil survey of San Joaquin County for use in the Comprehensive Site Wide RI/FS.
93/04/09	DTSC	DDRW-BE	DTSC recommending that the Final Engineering Report for the Well Monitoring Program be discussed at the April Project Managers' meeting.
93/04/09	DTSC	DDRW-BE	Notification of approval of Operable Unit No. 1 Feasibility Study.
93/04/12	DDRW-BE	CoE	DDRW requesting CoE prepare sections 2.1.6 and 2.1.7 for the Report of Waste Discharge.
93/04/12	EPA	DDRW-BE	EPA's comments on the Draft Work Plan Amendments for Phase 1 of the Comprehensive RI/FS.
93/04/12	RWQCB	DDRW-BE	RWQCB Comments on the Draft Comprehensive RI/FS Work Plan Amendments and evaluation of detection limits for the Comprehensive Phase 1 Remedial Investigation.
93/04/12	TRC Member	DDRW-BE	Letter submitting comments on the TRC minutes.
93/04/13	DDRW-BE	MW	DDRW providing MW with copies of DDRW Tracy Facility's Project Managers' meeting minutes for the period October 10, 1991 through January 14, 1993.
93/04/14	Enscco	DDRW	Analytical Services Quality Assurance Project Plan for the Comprehensive RI/FS
93/04/15	TRC Member	DDRW-BE	Letter responding to the minutes of the TRC meeting for DDRW Tracy.
93/04/19	DDRW-BE	EPA	Letter transmitting minutes for the Project Managers' meeting held on 23 March 1993.
93/04/26	DDRW-BE	TRC Member	DDRW responding to comments made on the TRC meeting minutes of 15 April 1993.
93/04/26	RWQCB	DDRW-BE	RWQCB addressing concerns they have with the Site Wide Remedial Investigation Work Plan.
93/04/29	DDRW-BE	CoE	DDRW requesting that CoE hydrogeologists review RWQCB well survey test results.

Date	Author	Addressee	Subject
93/05/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Draft Groundwater Treatment Pilot Plant Three Month Evaluation Report
93/05/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Final Well Monitoring Program. Quarterly Monitoring Report, January 1993 Sampling Round
93/05/12	CoE	DDRW	Defense Distribution Region West, Tracy Facility, Operable Unit No. 1, Groundwater Treatment Remedial Design, Statement of Work
93/05/14	DDRW-BE	CoE	DDRW providing CoE a copy of the DDRW Environmental Program Review performed by the U.S. Environmental Hygiene Agency.
93/05/14	DDRW-BE	RWQCB	DDRW submitting the Tracy Facility's Report of Waste Discharge.
93/05/15	DDRW		Report of Waste Discharge for Defense Distribution Region West, Tracy Facility, Tracy, CA
93/05/18	DDRW-BE	RWQCB	DDRW notifying RWQCB that water was pumped from its storm water pond to the West Side Irrigation District's distribution system.
93/05/18	DDRW-BE	CAAE	DDRW responding to a letter from Congressman Richard Pombo.
93/05/26	DDRW-BE	CAAE	DDRW forwarding a copy of the Tracy Facility's Report of Waste Discharge.
93/05/27	DDRW-BE	EPA	Request for a decision on the CERCLA 15-Month Rule.
93/06/01	DTSC	DDRW-BE	DTSC recommending that DDRW explore long-term remedial alternatives for residents impacted by groundwater contamination.
93/06/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Final Amendments to the Comprehensive Remedial Investigations/Feasibility
93/06/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Draft Groundwater Treatment Pilot Plant Injection Well Rehabilitation and Chemical Testing Work Plan
93/06/02	CoE	DDRW-BE	Response to DDRW-Tracy letter of 29 April 1993, Regional Water Quality Control Board Well Survey Test Results
93/06/03	DDRW-BE	DTSC	Alternatives water supply for the Rose and Raspo properties.
93/06/04	RWQCB	DDRW-BE	RWQCB comments on the Draft Record of Decision for Operable Unit No. 1.
93/06/07	DDRW-BE	CAAE	DDRW responding to an inquiry from Congressman Richard Pombo.
93/06/08	DDRW-BE	EPA	Final minutes for the Project Managers' meeting held 23 March 1993.
93/06/08	DDRW-BE	EPA	Letter transmitting draft minutes for the Project Manager's Meeting held 27 - 28 Apr. 93.
93/06/10	DTSC	DDRW-BE	DTSC comments on the Draft Record of Decision for Operable Unit No. 1.
93/06/11	DDRW-BE	CoE	DDRW comments on the Operable Unit No. 1 Groundwater Treatment Remedial Design scope of work.1992.
93/06/11	RWQCB	DDRW-BE	RWQCB comments on the Statement of Work for Groundwater for Groundwater Treatment Remedial Design.
93/06/15	DDRW-BE	CoE	DDRW requesting CoE obtain repair costs from MW for level monitoring wells 48 and 57.
93/06/16	DDRW-BE	CoE	DDRW requesting WCC provide a legal review/approval of the ARARs section for the Draft Final ROD.
93/06/21	EPA	DDRW-BE	Minutes of the conference call between EPA and RWQCB held June 18, 1993.
93/06/24	DDRW-BE	CoE	Response to EPA Draft OU-1 Rod comments.

Date	Author	Addressee	Subject
93/06/29	DDRW-BE	CoE	Draft Groundwater Treatment Pilot Plant Injection Well Rehabilitation and Chemical Testing Work Plan review comments.
93/06/30	DDRW-BE	CoE	DDRW requesting established of background levels for metals and pesticides at DDRW.
93/06/30	DDRW-BE	EPA	Submission of minutes for a conference call held on March 1993.
93/06/30	DDRW-BE	TRC Member	DDRW response to TRC comments.
93/07/02	MW	DDRW	Groundwater Treatment Pilot Monthly Operations Reports No 2.
93/07/02	RWQCB	EPA	RWQCB comments on EPA's letter dated 21 June 1993.
93/07/07	MW	CoE	Draft Groundwater Modeling Workplan for Defense Distribution Region West, Tracy, California
93/07/15	DDRW-BE	EPA	Minutes for the Project Managers' meeting held on 25 May 1993.
93/07/15	DDRW-BE	RWQCB	Letter transmitting the DDRW Tracy Facility Supply Well #4 Abandonment Work Plan.
93/07/15	DDRW-BE	CoE	Letter requesting the repaation of well LM-57.
93/07/22	MW	DDRW-BE	Minutes for the Project Managers' meeting held on 7 July 1993.
93/07/22	MW	DDRW-BE	Minutes for the Project Managers' meeting held on 8 July 1993.
93/07/28	EPA	DDRW-BE	EPA comments on the Draft Final ROD for OU-#1.
93/08/01	MW	DDRW	Final Groundwater Treatment Pilot Plant Three Month Evaluation Report No. 2
93/08/01	MW	DDRW	Defense Distribution Region West, Final Well Monitoring Program, Quarterly Monitoring Report, April 1993 Sampling Round.
93/08/01	WCC	DDRW	Final Operable Unit No. 1, Record of Decision, DDRW-Tracy, California
93/08/03	MW	CoE	Written notification concerning the DDRW-Tracy Pilot Plant system shutdowns occurring on July 19 and July 29, 1993.
93/08/04	MW	DDRW-BE	Letter transmitting video tapes and log sheets from the industrial waste pipeline investigation.
93/08/04	MW	CoE	Written notification of the Tracy Pilot Plant system shutdown occurring on 3 August 1993.
93/08/11	RWQCB	DDRW-BE	Letter approving the Draft Final OU-1 ROD.
93/08/11	RWQCB	DDRW-BE	RWQCB approving the Draft Final Record of Decision.
93/08/12	DTSC	DDRW-BE	DTSC comments on the Work Plan for Well 4 Abandonment.
93/08/17	EPA	DDRW-BE	EPA responding to DDRW's letter of May 27, 1993.
93/08/20	RWQCB	EPA	RWQCB's response to information received from EPA regarding the Draft ROD for OU-1.
93/08/26	DDRW		Work Plan for Well 4 Abandonment at Defense Distribution Region West, Tracy, California
93/08/26	EPA	DDRW-BE	Letter documenting a telephone conversation with CoE regarding potential modification to the final amendments to the Comprehensive RI/FS Work Plan.
93/08/30	DDRW-BE	EPA	Letter transmitting minutes for the Project Managers' meeting held on 7 July 1993.
93/09/01	DDRW-BE	CoE	Submission of the amendments to the Well #4 Abandonment Work Plan.
93/09/01	DDRW-BE	EPA	Letter submitting a copy of the OU-1 signature pages for the DDRW Tracy ROD.
93/09/03	DDRW-BE	EPA	Letter transmitting the OU-1 Design Schedule.
93/09/13	MW	CoE	Written notification of the DDRW Tracy Pilot Plant shutdown occurring on 8 September 1993.
93/09/19	MW	DDRW-BE	Final Phase 1 Site-Wide Ecological Assessment Work Plan for the Naval Air Station Moffett Field

Administrative Record File Index - DDJC Tracy (Continued)

Date	Author	Addressee	Subject
93/09/20	EPA	DDRW-BE	EPA comments on the Draft Remedial Design/Remedial Action Schedule for Operable Unit No. 1.
93/09/22	RWQCB	DDRW-BE	RWQCB comments on the Draft Groundwater Modeling Work Plan.
93/09/27	EPA	DDRW-BE	EPA comments on the Final Well Monitoring Program Quarterly Monitoring Report, April 1993 Sampling Round (August 1993).
93/09/30	DDRW-BE	CoE	DDRW requesting COE investigate the possibility and potential cost savings of using dedicated sampling devices at DDRW Tracy monitoring wells.
93/10/01	DDRW-BE	EPA	DDRW Operable Unit #1 revised Design Schedule.
93/10/01	MW	DDRW	Final Groundwater Modeling Interim Technical Memorandum, Defense Distribution Region West, Tracy, California
93/10/05	MW	CoE	Notification that the DDRW Tracy Pilot Plant was shutdown due to a brief power failure.
93/10/05	MW	CoE	MW response to USACE review comments on the July monthly report.
93/10/06	DDRW-BE	CoE	DDRW providing maps of the water and wastewater systems at the DDRW Tracy Facility.
93/10/07	CoE	USEHA, HSHB-ME-SR	CoE requesting that HSHB-ME-SR review the DDRW Tracy Risk Assessment work.
93/10/12	EPA	DDRW-BE	EPA comments on the revised RD/RA Schedule for DDRW Tracy OU-1.
93/10/15	RWQCB	DDRW-BE	RWQCB comments on the Groundwater Treatment Pilot Plan System Start-up, Prove- out and Evaluation Reports.
93/10/21	MW	CoE	Notification that file DDRW Tracy Pilot Plant system was shutdown. The shutdown was caused by a high level alarm at the pad drainage sump.
93/10/22	DDRW-BE	EPA	DDRW Operable Unit# 1 revised Design Schedule.
93/10/25	DDRW-BE	RWQCB	Waste Discharge Requirements (WDRs) revision for Defense Distribution Region West, Tracy Facility
93/10/27	DDRW-BE	DTSC	Federal Facility Agreement personnel change notification.
93/10/27	DDRW-BE	EPA	Federal Facility Agreement personnel change notification.
93/10/27	DDRW-BE	RWQCB	Federal Facility Agreement personnel change notification.
93/11/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Well Monitoring Program, Well Redevelopment Report
93/11/01	MW	DDRW	Draft Pre-Design Technical Summary and Remedial Design Work Plan
93/11/17	MW	CoE	Response to review comments on September Monthly Report.
93/11/30	EPA	DDRW-ABE	EPA notifying DDRW of receipt of the Draft Risk Assessment SOW for the Site Wide Comprehensive Work Plan.
93/12/01	EPA	DDRW-ABE	Notification of a change in EPA's RI/FS oversight support contractor.
93/12/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Draft Groundwater Treatment Pilot Plant Operation and Maintenance Manual
93/12/01	MW	DDRW	Final Well Monitoring Program, Quarterly Monitoring Report, July 1993 Sampling Round
	93/12/10	DDRW-ABE	CoE DDRW review comments on the Draft Risk Assessment Statement of Work for the Site Wide Comprehensive Work Plan.

Date	Author	Addressee	Subject
93/12/10	DDRW-ABE	EPA	Comments on EPA's comments of the Final Well Monitoring Program Quarterly Monitoring Report, April 1993 Sampling Round.
93/12/13	DDRW-ABE	CoE	Review comments for the Final Groundwater Modeling Interim Technical Memorandum.
93/12/13	DDRW-ABE	Resident	DDRW providing sampling results for the January and April 1993 sampling rounds.
93112/13	EPA	DDRW-ABE	Letter transmitting EPA preliminary risk calculations with regard to human health affects associated with groundwater data collected.
93/12/13	MW	CoE	Response to review comments on the August Monthly Report and Startup and Prove-out Report.
93/12/14	EPA	DDRW-ABE	EPA comments on the Groundwater Modeling Interim Technical Memorandum.
93/12/16	RWQCB	DDRW-ABE	RWQCB responding to DDRW letter dated October 25, 1993.
93/12/20	DDRW-ABE	City of Tracy	Placement of information repository for DDRW,
93/12/22	EPA	DDRW-ABE	EPA comments on the Well Monitoring Program, Well Development Report.
93/12/23	DDRW-ABE	DTSC	DDRW providing DTSC information regarding the use of Eureka Laboratory.
93/12/28	DTSC	DDRW-ABE	Letter concurring with DDRW's Risk Assessment Statement of Work.
93/12/30	DDRW-ABE	EPA	Notification of soil contamination at Building 201 (DDRW Tracy Facility).
93/12/31	DTSC	DDRW-ABE	DTSC and RWQCB comments on the Well Redevelopment Report and Groundwater Modeling Technical Memorandum.
94/01/01	MW	DDRW	Final Groundwater Treatment Pilot Plan Three Month Evaluation Report No. 3
94/01/03	DDRW-ABE	CoE	Building 201 expansion foundation fill material.
94/01/06	DDRW-ABE	CoE	DDRW requesting monitoring well/air stripper repairs.
94/01/12	EPA	DDRW-ABE	EPA's comments on the Draft Predesign Technical Summary and Draft Remedial Design/ Remedial Action Work Plan for OU-1.
94/01/14	DDRW-ABE	CoE	DDRW comments on the RI/FS Site Characterization Report.
94/01/19	DDRW-ABE	EPA	Minutes for the Project Managers' Meeting held December 7-8, 1993.
94/02/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Groundwater Treatment Pilot Plant Monthly Operation Reports No. 3
94/02/08	DDRW-ABE	CoE	DDRW comments on the Groundwater Treatment Pilot Plant Monthly Operations Report No. 3.
94/02/10	EPA	DDRW-ABE	EPA comments on the Drift SOW for Well Evaluation and Abandonment and Draft SOW for Comprehensive RI/FS Work Plan Amendment.
94/02/11	CoE	DDRW-ABE	Notification of access agreements from landowners whose property adjoins DDRW Tracy.
94/02/11	DTSC	DDRW-ABE	DTSC requesting an extension for comments on the Comprehensive Site Wide RI/FS, Phase 1, Analytical Data Report.
94/02/14	EPA	DDRW-ABE	EPA comments on the Draft Comprehensive RI/FS, Phase 1, Site Characterization Report.
94/02/16	DDRW-ABE	DTSC	DDRW response to DTSC letter dated 11 February 1994.
94/02/23	DDRW-ABE	CoE	DDRW addressing EPA's comments on the Comprehensive Site Wide RI/FS, Site Characterization Report.
94/03/09	CoE	DDRW-ABE	CoE providing information on off-site monitoring well easements.
94/03/10	DDRW-ABE	CoE	Air stripper maintenance problems experienced at the DDRW Tracy Facility.

Date	Author	Addressee	Subject
94/03/10	MW	RWQCB	MW proposal to streamline the reporting process of the Quarterly Monitoring Reports under the Well Monitoring Program.
94/03/11	DDRW-ABE	CoE	DDRW review comments on the air stripper monthly operations report.
94/03/15	DTSC	DDRW-ABE	Comments on the Draft Comprehensive RI/FS - Phase 1 - Site Characterization Report/Analytical Data Report, Defense Distribution Region West, Tracy Site.
94/03/23	EPA	DDRW-ABE	EPA's response to streamlining the quarterly monitoring report format.
94/03/30	RWQCB	DDRW-ABE	RWQCB comments on the Groundwater Treatment Pilot Plant Three Month Evaluation Report No. 3.
94/04/01	MW	DDRW-ABE	Defense Distribution Region West, Tracy, California, Characterization of investigation- Derived Waste, Remedial Investigation, Phase 1
94/04/01	MW	DDRW	Draft Remedial Measure Expansion Design Analysis, DDRW, Tracy,
94/04/01	MW	CoE Huntsville	Draft DDRW - Tracy Facility Operable Unit 1 Remedial Action Plan
94/04/05	DDRW-ABE	EPA	Minutes for the Project Managers' Meeting held on 15 and 16 February 1994.
94/04/07	MW		Minutes from the Premobilization meeting for OU-1 CPT investigation held on 7 April 1994.
94/04/08	DDRW-ABE	Resident	Private well sample results.
94/04/11	DDRW-ABE	TRC Members	Minutes for the Technical Review Committee meeting held on 15 February 1994.
94/04/11	DDRW-ABE	CoE	DDRW comments on the Groundwater Treatment Pilot Plant Monthly Operations Report for March 1994.
94/04/13	CoE	DDRW-ABE	Revised Federal Facility Agreement proposed schedule.
94/04/13	DDRW-ABE	Resident	Private well sample results.
94/04/13	DDRW-ABE	Resident	Private well sample results.
94/04/14	DDRW-ABE	CoE	DDRW comments on the Draft Well Abandonment Work Plan.
94/04/14	DDRW-ABE	PHS	DDRW submitting a map and legend depicting all the solid waste management units and underground storage tanks at the DDRW Tracy Facility.
94/04/14	EPA	DDRW-ABE	EPA comments on the Draft Well Abandonment Work Plan.
94/04/18	CoE	DDRW	Defense Distribution Region West, Tracy, California, Subsistence Warehouse Stockpiled Soil, Rapid Response, Final Report
94/04/18	MW	CoE	Minutes from the Baseline Risk Assessment Work Plan Meeting held on 31 March 1994.
94/04/19	DTSC	DDRW-ABE	DTSC comments on the Draft Well Abandonment Work Plan.
94/04/20	DDRW-ABE	RWQCB	Request for extension of Waste Discharge Requirements operating permit.
94/04/22	DDRW-ABE	EPA	Letter submitting the revised Federal Facility Agreement schedule.
94/04/27	DTSC	DDRW-ABE	DTSC comments regarding the Draft Well Abandonment Work Plan for DDRW Tracy.
94/04/29	MW	CoE	DDRW Tracy Site Witte Background Assessment Technical Memorandum.
94/05/01	MW	DDRW	Final Well Monitoring Program, Quarterly Monitoring Report, January 1994 Sampling Round
94/05/01	MW	CoE, Huntsville	Community Relations Plan, DDRW-Tracy
94/05/02	TRC Member	DDRW-AB	Comments on the TRC meeting of 15 February 1994.
94/05/06	EPA	DDRW-ABE	EPA requesting a written statement which explains the "good cause" for the revised FFA schedules.
94/05/09	DDRW-ABE,	EPA	DDRW's FFA-A schedule rationale as requested by EPA

Date	Author	Addressee	Subject
94/05/11	DDRW-ABE	CoE	DDRW comments on the IRM design.
94/05/12	Dames & Moore	DDRW	Draft Chemical Data Acquisition Plan, Well Abandonment
94/05/12	Dames & Moore	DDRW	Site Safety and Health Plan for Well Abandonment
94/05/12	MW	EPA	MW requesting an informal review of the format for the extended data packages being provided by their subcontract laboratory.
94/05/13	DDRW-ABE	TRC Members	Final minutes for the TRC meeting held on 15 February 1994.
94/05/18	DDRW-ABE	TRC Member	DDRW's responding to letter dated 2 May 1994.
94/05/19	EPA	DDRW-ABE	Approval of extensions to DDRW Tracy FFA Schedules for the Comprehensive RI/FS/PP and ROD and OU-1 RD/RA.
94/05/20	DTSC	DDRW-ABE	DTSC's and RWQCB's concurrence of the Characterization of Investigation Derived Waste, Remedial Investigation, Phase I report.
94/05/23	EPA	DDRW-ABE	EPA comments on the characterization of Investigative derived waste report.
94/05/24	DDRW-ABE	CoE	DDRW comments oil Groundwater Treatment Pilot Plant Three- Month Evaluation Report No. 4.
94/05/24	DDRW-ABE	CoE	DDRW Tracy's comments on Draft Chemical Data Acquisition and Health and Safety Plans for Supply Well #4 Abandonment.
94/05/25	EPA	DDRW-ABE	EPA requesting additional information and a written response their letter dated 23 May 1994.
94/05/26	DDRW-ABE	CoE	Clarification of DDRW Tracy's position regarding monitoring well sample turbidity.
94/05/26	DTSC	DDRW-ABE	DTSC approving revisions to the FFA schedule.
94/06/01	MW	DDRW	Draft IRM Expansion - Installation of Injection/ Extraction Wells and Chimney Drains Work Plan
94/06/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Draft Interim Groundwater Treatment Plant Expansion
94/06/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Draft Interim Groundwater Treatment Plant Expansion. Volume II - Drawings
94/06/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Characterization of Investigation-Derived Waste. Remedial Investigation, Phase I
94/06/06	DDRW-ABE	CoE	DDRW requesting CoE contact Montgomery Watson regarding software requirements for the DDRW Tracy IRM.
94/06/06	EPA	DDRW-ABE	EPA comments on the Draft Well Monitoring Program, Annual Monitoring Report, October 1993 Sampling Round.
94/06/06	MW	CoE	Response to EPA Comments on Draft Investigative Derived Waste Report.
94/06/10	DTSC	DDRW-ABE	Comments on the Draft Chemical acquisition Plan and Site Safety and Health Plan for the Abandonment of Well No.4 report
94/06/13	DTSC	DDRW-ABE	DTSC comments on the Draft Chemical Data Acquisition Plan, Well Abandonment, and Draft Site Safety and Health Plan, Well Abandonment.
94/06/15	DDRW-ABE	CoE	DDRW comments on the Draft Well Monitoring Program, Annual Monitoring Report.
94/06/20	DDRW-ABE	CoE	DDRW comments on the Final Well Monitoring Program, Quarterly Well Monitoring Report, January 1994 Sampling Round.

Date	Author	Addressee	Subject
94/06/21	DDRW-ABE	CoE	Well 4 abandonment requirements.
94/06/22	DTSC	DDRW-ABE	Request for extension for comments concerning the Draft Well Monitoring Program, Annual Monitoring Report.
94/06/22	RWQCB	DDRW-ABE	Notification of change of Project Manager for RWQCB.
94/06/23	DDRW-ABE	CoE	DDRW comments on the Draft Interim Remedial Measure Expansion - Installation of Injectional Extraction Well and Chimney Drains Work Plan.
94/06/23	EPA	DDRW-ABE	EPA comments on the example extended data package.
94/06/27	DDRW-ABE	CoE	DDRW comments on the Draft Final Well Abandonment Work Plan.
94/06/27	DTSC	DDRW-ABE	DTSC comments on the Draft Final Well Abandonment Work Plan.
94/06/28	DDRW-ABE	CoE	DDRW comments on the Comprehensive Site-Wide Baseline Risk Assessment Work Plan.
94/06/28	EPA	DDRW-ABE	Relocation of the information repository/administrative record for DDRW Sharpe and Tracy Facilities.
94/06/29	EPA	DDRW-ABE	Commends on the Draft Chemical Data Acquisition Plan - Well Abandonment, May 94
94/06/30	DDRW-ABE	CoE	DDRW comments on the Draft Final Site Characterization Report.
94/06/30	EPA	DDRW-ABE	EPA comments on the Draft Final Well Abandonment Work Plan.
94/07/01	MW	DDRW	Final Groundwater Treatment Pilot Plan Three-Month Evaluation Report No. 4
94/07/06	DDRW-ABE	CoE	DDRW review comments on the Site Wide RI/FS Analytical Data Report.
94/07/13	DTSC	DDRW-ABE	Review comments on Draft Final Comprehensive RI/FS Phase I Site Characterization Report and Analytical Data Report.
94/07/14	CoE	DDRW-ABE	Use of Missouri River Division Laboratory for DDRW Tracy Facility investigations.
94/07/25	MW	CoE	Minutes for the meeting at EPA on 19 July 1994.
94/07/27	DTSC	DDRW-ABE	Review comments on the Draft Well Monitoring Program.
94/08/01	CoE	DDRW	Scope of Work for IRM Expansion
94/08/01	MW	DDRW	Defense Distribution Regional West, Tracy, California, Groundwater Treatment Pilot Plant Monthly Operations Reports No. 4.
94/08/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Final Well Monitoring Program.
94/08/01	MW	CoE Huntsville	DDRW Tracy, California, Draft Groundwater Treatment Pilot Plant Three-Month Evaluation Report No. 6
94/08/10	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/11	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/11	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/11	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/11	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/12	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/12	DDRW-ABE	Resident	Private well results for the January 1994 sampling round.
94/08/12	DTSC	DDRW-ABE	Extension for submittal of comments concerning the Draft Comprehensive Site Wide Baseline Risk Assessment Work Plan.
94/08/12	EPA	DDRW-ABE	Comments on the Draft Comprehensive RI/FS, Phase II Work Plan and Draft Comprehensive Risk Assessment Work Plan.

Date	Author	Addressee	Subject
94/08/15	DTSC	DDRW-ABE	Review comments on Draft Comprehensive RI/FS, Phase 11 Work Plan.
94/09/24	DDRW-ABE	CoE	Comments on the Draft Comprehensive RI/FS Work Plan.
94/08/31	DDRW-ABE	EPA	Minutes from the Project Managers' Meeting held on 7-9 June 1994.
94/09/01	CoE	DDRW-ABE	Revised FFA schedule for Operable Unit 1.
94/09/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Final Well Abandonment Work Plan
94/09/01	MW	DDRW	Defense Distribution Region west, Tracy, CA, Final Groundwater Treatment Pilot Plant Three-Month Evaluation, Report No. 5
94/09/01	MW	CoE Huntsville	DDRW Tracy, California, Final Groundwater Treatment Pilot Plant Three-Month Evaluation Report No.5
94/09/08	DDRW-ABE	EPA	Request for FFA schedule extension,
94/09/19	EPA	DDRW-ABE	EPA concurrence of low-flow groundwater sampling.
94/09/21	EPA	DDRW-ABE	Approval of proposed extension to DDRW Tracy FFA schedule lot Operable unit 1 RD/RA.
94/10/01	MW	DDRW	Draft Final Comprehensive Remedial Investigation/ Feasibility Study - Phase I, Site Characterization Report
94/10/0l	MW	DDRW	Final Well Monitoring Program, Annual Monitoring Report, October 1993 Sampling Round
94/10/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Final Comprehensive Remedial Investigation/Feasibility Study - Phase I, Analytical Data Report
94/10/24	DDRW-ABE	EPA	Minutes for the Project Managers' Meeting held on 17-18 August 1994.
94/10/25	EPA	DDRW-ABE	Comments on Final Phase I Site Characterization Report and Draft Final Phase II Work Plan.
94/11/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Final Groundwater Treatment Pilot Plant Three-Month Evaluation Report No. 6
94/11/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Interim Groundwater Treatment Plant Expansion Start-up and Prove- out Work Plan, Table 2-1
94/11/01	MW	CoE Huntsville	Draft Well Monitoring Program Low-Flow Sampling Study Work Plan for Defense Distribution Region West. Tracy
94/11/01	MW	CoE Huntsville	DDRW Tracy, California, Draft Groundwater Treatment Pilot plant Three-Month Evaluation Report No. 7
94/11/01	MW	DDRW-Tracy	Interim Groundwater Treatment land Expansion Construction management Mid-Project Progress Report, Aug 25, 1994 to Oct 19, 1994
94/11/04	MW	CoE	Minutes for 11 October 1994 conference call on Draft Baseline Risk Assessment Work Plan.
94/11/11	DTSC	DDRW-ABE	Comments on Draft Final Phase II Work Plan.
94/11/28	DDRW-ABE	RWQCB	Waste discharge requirements for DDRW Tracy.
94/12/01	CoE	DDRW	Scope of Work for Engineering Evaluation/Cost Analysis for Industrial Waste Lagoon Removal Action at Defense Distribution Region West, Tracy, CA
94/12/01	CoE	DDRW	Scope of Work for Engineering Evaluation/Cost Analysis for Industrial Waste Pipeline Removal Action at Defense Distribution Region West, Tracy,
94/12/01	CoE	DDRW	Appendix A, Annex B, Investigation, Alternatives Proposal, and Design for Removal Action of Underground Storage Tank Sites at DDRW Tracy, CA
94/12/01	DDRW-ABE	EPA	Minutes for the Project Managers' Meeting held on 19 October 1994.

Date	Author	Addressee	Subject
94/12/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Final Bench Test Work Plan
94/12/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Well Monitoring Program, 1994 Work Monitoring Program
94/12/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Final Comprehensive Remedial Investigation/Feasibility Study - Phase II Work Plan
94/12/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Lower Tulare Monitoring Well Technical Memorandum
94/12/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Start-Up, Prove-Out, and Extended Prove-Out Work Plan
94/12/01	MW	DDRW	Defense Distribution Region west, Tracy, Well Monitoring Program, Quarterly Monitoring Report, August 1994 Sampling Round
94/12/07	James J. Oakham, Jr., MAI	CoE Sacto Appraisal Branch	Real Estate Planning Report Part A for Proposed Easement Acquisitions Near The Tracy Facility DDRW
94/12/07	James J. Oakham, Jr., MAI	CoE Sacramento, Appraisal Branch	Real Estate Planning Report Part A for Proposed Easement Acquisitions for Contaminant Plume Management near the Tracy Facility
94/12/08	DDRW-ABE		Minutes for the Technical Review Committee Meeting held on 3 Oct 94
94/12/12	EPA	DDRW-ABE	EPA comments on the Draft Final Comprehensive Risk Assessment Work Plan.
94/12/14	DDRW-ABE	Resident	Private wells results for the March 1994 sampling round.
94/12/14	DDRW-ABE	Resident	Private well results for the March 1994 sampling round.
94/12/14	DDRW-ABE	Resident	Private well results for the March 1994 sampling round.
94/12/14	DDRW-ABE	Resident	Private well results for the March 1994 sampling round.
94/12/15	DDRW-ABE	Resident	Private well results for the March 1994 sampling round.
94/12/15	DDRW-ABE	Resident	Private well results for the March 1994 sampling round.
94/12/15	DTSC	DDRW-ABE	DTSC and RWQCB comments on the Draft Final Phase II Work Plan.
94/12/19	DDRW-ABE	Resident	Private well results for the March 1994 sampling round.
94/12/19	DDRW-ABE	CoE	DDRW comments on the Interim Groundwater Treatment Plant Expansion drawings.
94/12/28	MW	CoE	Conference call minutes on the Draft Final Baseline Risk Assessment Work Plan.
95/01/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Final Groundwater Treatment Pilot Plant Three-Month Evaluation Report No. 7
95/01/01	MW	CoE Huntsville	DDRW Tracy, California, Groundwater Treatment Pilot Plant Monthly Operations Reports No.4, July - December 1994
95/01/05	RC	CoE Huntsville	DDRW Sharpe/Tracy Integrated Geographic Information System Needs Analysis and Requirements Document
95/01/11	EPA	DDRW-ABE	Comments on statements of work for removal actions for the industrial waste lagoon/industrial waste pipeline and underground storage tanks.
95/01/13	EPA	DDRW-ABE	Comments on the Low-Flow Sampling Work Plan.
95/01/18	DTSC	DDRW-ABE	DTSC and RWQCB comments on the Draft Well Monitoring Program, Low-Flow Sampling Study Work Plan.
95/01/20	DDRW-ABE	CoE	Comments on the Low Flow Sampling Study Work Plan.
95/01/23	DLA COL R.S. LaBaron	ASCW-BE Tracy	8 Feb 95 TRC Meeting @ Ogden, Utah

Date	Author	Addressee	Subject
95/01/27	DDRW-ABE	RWQCB	Comments on the Draft Waste Discharge Requirements Permit.
95/01/31	DDRW-ABE	EPA	Request for a 23-day extension for the Operable Unit 1 design/implementation schedule.
95/02/01	MW Jamie S. Atwood	Steve Light, CEHND	Minutes of Project Coordination Meeting on January 23, 1995
95/02/01	RC	CoE Huntsville	Draft Final DDRW Sharpe/Tracy Integrated Geographic Information System (GIS) Needs Analysis and Requirements Document
95/02/06	EPA	DDRW-ABE	EPA response to DDRW's letter of 31 January 1995.
95/02/08	DDRW-ABE	EPA	DDRW submitting a table as requested in EPA's letter dated 6 February 1995.
95/02/09	DDRW-ABE	EPA	EPA approving the FFA schedule extension for OU-1 RD.
95/02/10	MW	CoE Huntsville	January 27, 1995 Conference Call Minutes on Draft Final BRAWP
95/02/16	ASCW-BE	CoE	Comments on the Environmental Baseline Study Statement of Work
95/02/20	MW	Steve Light, CEHND	Confirmation of Abandonment and Demolition Task at Well AG-3
95/02/20	MW	Steve Light, CEHND	A-E Weekly Quality Control Report: Well Investigation and Abandonment of Well AG-3
95/02/25	ASCW-BE	RWQCB	DDRW requesting a 15-day extension of the due date for the DDRW Tracy air stripper monitoring report.
95/03/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Draft Final Comprehensive Site-Wide Baseline Risk Assessment Work Plan.
95/03/01	MW	DDRW	Defense Distribution Region West, Tracy, CA, Final Well Monitoring Program, Low-Flow Sampling Study Work Plan
95/03/01	MW	DDRW	Defense Distribution Region West, Tracy, California, Well Monitoring Program, Quarterly Monitoring Report, October 1994 Sampling Round
95/03/01	MW	CoE Huntsville	Defense Distribution West, Tracy, California: Well Monitoring Program; Low-Flow Sampling Study Work Plan
95/03/01	PTASI	ASCW-BE	Monthly Monitoring Report: March 1993
95/03/09	EPA	ASCW-BE	EPA comments on the Pre-Design Data Report for Operable Unit 1.
95/03/10	MW	Marshall Cloud	Final Well Repairs for Well Abandonment DO (21)
95/03/10	PTASI	ASCW-BE	MONTHLY REPORT FOR FEBRUARY 1-28,1995
95/03/10	RC	CoE Huntsville	Final DDRW Sharpe/Tracy Integrated Geographic Information System (IGIS) Needs Analysis and Requirements Document
95/03/17	ASCW-BE	Residents	Private wells results for the August 1994 sampling round.
95/03/17	ASCW-BE		Minutes for the Technical Review Committee Meeting held 5 December 1994.
95/03/20	ASCW-BE		Minutes for the Project Managers' Meeting held 29-30 November 1994.
95/03/22	Unknown	DDRW - Tracy	Minutes of Project Managers' Meeting held 22-23 March 1995
95/03/22	Unknown	Participants	RPM Minutes March 22, 1995
95/03/27	ASCW-BE	RWQCB	Request for permission to shut down the Operable Unit 1 air stripper for maintenance.

Date	Author	Addressee	Subject
95/03/29	RC	CoE Huntsville	DDRW Sharpe/Tracy Integrated Geographic Information System (IGIS) Database Design Document (Draft Final)
95/03/30	EPA	ASCW-BE	Response to EPA comments on the Draft Final Comprehensive Baseline Risk Assessment Work Plan for DDRW Tracy.
95/04/01	MW	CoE Huntsville	DDRW, Tracy, CA Draft Extended Prove-Out report Expanded Interim Remedial Measure System
95/04/01	MW	CoE Huntsville	DDRW, Tracy, CA, 30 Percent Remedial Design Report & Analysis for Operable Unit 1
95/04/01	RC	CoE Huntsville	Draft Delivery Order 002 Environmental Baseline Study Work Task Proposal for Defense Distribution West Sharpe/Tracy, California
95/04/01	RC	CoE Huntsville	Draft Delivery Order 002 Environmental Baseline Study Work Task Proposal for Defense Distribution West Sharpe/Tracy, California
95/04/06	MS Steve Krueger	Marshall Cloud	5 Apr 95 Conference Minutes on Discussion of Work Submittal Forwarded to CEHND Prior to Meeting on OU1 Design
95/04/06	USEPA, Michael	ASCW-BE	Review comments on PWP for Monitoring Well Sampling & Analysis @ DDRW Sharpe & Tracy; Amendments Work for 27 Dec 94
95/04/10	PTASI	ASCW-BE	MONTHLY REPORT FOR MARCH 1-31, 1995
95/04/11	MW Robert P. Schlicher	Steve Light, Huntsville	Status Update of IRM Expansion Project at Tracy
95/04/11	RC Scott Kranhold	ASCW-BE	Copy of EBS Questionnaire for Interviewing Property Owners
95/04/13	DTSC Jim Pinasco	Marshall Cloud	Review of the Draft Pre-Design Data Report, DDRW, Tracy
95/04/17	CoE Huntsville	ASCW-BE Tracy	COE Package for Out Lease of Tracy Annex
95/04/17	MW Andrew Somes	ASCW-BE	State of California, Department of Water Resources, Well Completion Reports for Tracy
95/04/17	MW Jamie S. Atwood	Steve Light, Huntsville	Comprehensive Summary of Approach Used for Determination of Depot-wide Soil & Deionized Water Extraction Test Soil Leachate Background Threshold Levels at Tracy
95/04/24	ASCW-BE, McIlvoy	RWQCB	Feb 1995 Monthly Report for Tracy Air Stripper
95/04/26	MW Nancy Barnes	ASCW-BE	List of Subcontractors for Site Access & Field Studies at Tracy
95/04/26	RC Francis E, Slavich	ASCW-BE and CoE Huntsville	Draft Environmental Baseline Study for Tracy
95/04/27	MW	Distribution List	Letter to Steve Light Regarding Phase III Sampling
95/04/27	MW	Steve Light	Technical Memo Review Comments and Phase III Sampling for Phase II Investigation and Report DDRW - Tracy
95/05/01	MW	CoE Huntsville	DDRW, Tracy, CA, Well Monitoring Program 1994 Annual Report
95/05/01	PTASI	ASCW-BE	Monthly Monitoring Report: May 1995
95/05/01	PTASI	DDRW - Tracy	Monthly Monitoring Report - May 1995
95/05/01	RC	ASCW-BE	Administrative Support Center West-Tracy Operable Unit 1 CPT Study Work Plan
95/05/01	The Stockton Record	General Public	Newspaper Article: Project Manager Wins Award for Innovative Way to Clean Up Depots
95/05/04	RC	CoE Huntsville	Draft ASCW Sharpe/Tracy Integrated Geographic System (IGIS) User Guides

Date	Author	Addressee	Subject
95/05/04	RC	CoE Huntsville	ASCW Sharpe/Tracy Integrated Geographic Information System Implementation Plan (Draft)
95/05/04	Tracy Press, Sam Matthews	ASCW-BE	City's Plans for Golf Course
95/05/04	USEPA, Michael Work	ASCW-BE Tracy	EPA's Review of Data Validation Portion of Tracy's Comprehensive RI/FS Phase II Analytical Data Report, Volumes I, II, III
95/05/05	PTASI	DDRW, Tracy Facility	Quarterly Monitoring Report: First Quarter 1995
95/05/10	PTASI	DDRW - Tracy	Monthly Monitoring Report, April 1995
95/05/11	MW Jamie S. Atwood	ASCW-BE Tracy	Video Survey of the Grouting of and Abandonment of Well AG3
95/05/11	USEPA, Michael Work	Marshall Cloud	Flow Chart For Amending a ROD
95/05/16	DDRW-Tracy RIM	ASCW-BE Tracy	IRM Specifications for Equipment, Well Pumps, Piping, Meters, & Valves for Tracy A/S System
95/05/18	USEPA, Michael Work	Marshall Cloud	Receipt of DDRW-Tracy's Draft Technical Memorandum: Comprehensive Remedial Investigation/Feasibility Study - Phase II (Mar 95 (Volumes I & II)
95/05/18	USEPA, Michael Work	Marshall Cloud	DDRW-Tracy's Draft Technical Memorandum: Comprehensive Remedial Investigation/Feasibility Study - Phase II, Volumes I & II
95/05/19	MW	Steve Light, CoE Huntsville	DDRW Tracy Background Discussions
95/05/23	MW Nancy Barnes	Steve Light	Draft Status Report: Abandonment of Well AG-3
95/05/26	Patricia L. Rivers, OUSD	ASCW-BE, Tracy	Technical Assistance for Public participation in the DERA Program-Federal Register Notice of Request for Comments
95/05/30	MW Nancy Barnes	Marshall Cloud	Weekly DQCRS from Road Work, Well Abandonment, & Phase III RI
95/06/01	MW	CoE Huntsville	Technical Memorandum Human Health Risk Assessment at Exposure Units 1,2,7
95/06/01	MW Susan Tiffany	ASCW-BE	Preliminary Applicable or Relevant and Appropriate Requirements for ASC-Tracy Feasibility Study
95/06/01	PTASI	DDRW - Tracy	Monthly Monitoring Report, June 1995
95/06/01	RC	ASCW-BE	Delivery Order 0003: OU Design Support Work Task Proposal
95/06/01	RC	CoE Huntsville	Operable Unit 1 CPT Study Work Plan
95/06/01	USACOE, Sacramento District	ASCW-BE	Environmental Baseline Study OU 1 Easement Properties
95/06/05	MW	Steve Light	DDRW-Tracy Phase II RI Final Investigation Derived Waste Report
95/06/05	MW Jamie S. Atwood	Steve Light and Marshall Cloud	Details Concerning DDRW-Tracy Phase II RI Final Investigation Derived Waste Report
95/06/08	Michael Work, USEPA	Mr. Marshall Cloud	DDRW-Tracy's 30 Per Cent Remedial Design Report and Analysis, Remedial Action Work Plan (Apr 95) for Operable Unit 1
95/06/08	Steven L. Glaser, MW	CoE Huntsville	Risk Assessment Criteria, Committee Meeting Minutes, May 9, 1995

Date	Author	Addressee	Subject
95/06/09	Karen Bessett, RWQCB, Central Valley	Mr. Marshall Cloud,	Addendum to Pre-Design Data Report for Operable Unit 1, DDRW Tracy
95/06/12	Dennis C. Noble, Attorney at Law	RRWQCB	Irrigation Well Installation 26101 S. Chrisman Road APN 252-040-05 Anthony Traina, et. al.
95/06/12	MW	Steve Light	A-E Weekly Quality Control Report, June 12, 1995, Well Investigation & Abandonment
95/06/14	Francis E. Slavick, RC	Steve Light	Delivery Order 0006, Project Management Contract DACA87-95-D-0001, Meeting Minutes, Public Relations
95/06/20	Francis E. Slavich, RC	Steve Light	Delivery Order 0003, Groundwater Treatment Remedial Design Support for DDRW Submittal of Work Task Proposal
95/06/20	Steven L. Glaser, MW	Marshall Cloud,	Baseline Risk Assessment at DDRW - Tracy
95/06/21	Nancy Barnes, MW	Steve Light	Submittal of Well Abandonment Work Plan for AG-3
95/06/26	Jim Pinasco, DTSC	Mr. Marshall Cloud	Review of 30 Per Cent Design Report and Analysis and Draft Remedial Action Work Plan for Operable Unit No. 1, DDRW, Tracy
95/06/26	Steven L. Glaser, MW	CoE Huntsville	Corrections and Clarifications to the Meeting Minutes of the May 9, 1995 Baseline Risk Assessment CCM for ASCW - Tracy
95/06/30	RC	CoE Huntsville	DDRW Sharpe/Tracy Integrated geographic Information System Draft Final Database Design Document
95/07/01	MW	CoE Huntsville	DDRW-Tracy Environmental Baseline OU 1 Easement Properties Final Report
95/07/01	PTASI	DDRW-Tracy	Monthly Monitoring Report July 1995
95/07/01	RC	CoE Huntsville	DDRW Sharpe/Tracy Integrated Geographic Information System Implementation Plan, Draft Final
95/07/01	RC	CoE Huntsville	DDRW Sharpe/Tracy Integrated Geographic Information System Draft Final User Guides, Version I
95/07/01	RC	CoE Huntsville	DDRW Sharpe/Tracy Integrated Geographic Information System, Draft final User Guides, Version II
95/07/05	PTASI	DDRW - Tracy	Quarterly Monitoring Report - April - June 1995
95/07/06	Diane Hinson, PHS, SJC	RWQCB	Proposed Irrigation Well Installation, APN 252-040-05, 26101 Chrisman Rd, DDRW Tracy
95/07/06	SWRCB, Central Region	Diane Hinson, SJCPHS	Proposed Irrigation Well installation, APN-252-040-05, 26101 S. Chrisman Road, Tracy
95/07/07	DoD, Material Mgt Distributions, IMP, Virginia Crowson	Mr. Marshall Cloud,	Proposed Easement Acquisitions for contaminant Plume Management Near DDRW - Tracy
95/07/11	MW	CoE Huntsville	Transmittal of Predraft Proposed Plan
95/07/17	Nancy Barnes, MW	Steve Light	A-E Weekly Quality Control Report, 17 July 95
95/07/18	Francis E. Slavich, RC	Steve Light	Delivery order 0003, Contract DACA87-95-D-001, Groundwater Treatment Remedial Design Support for DDRW OU#1 CPT Study Field Reports
95/07/18	Steven M. Newton,	Steve Light	Strawberry Agricultural Well Potential Impact on DDRW-Tracy

Date	Author	Addressee	Subject
95/07/20	Michael Work, USEPA	Marshall Cloud	DDRW Tracy Technical Memorandum, Human Health Risk Assessment at Exposure Units 1,2, & 7, June 1995
95/07/25	David C. Ennis	Steve Light	Possible Use of Zero Valent Metals for Operable Unit 1, Groundwater Cleanup at DDRW, Tracy
95/07/27	RC	Steve Light	Document Submission - Final Environmental Baseline Study
95/07/27	RWQCB, Central Valley	Jim Pinasco, DTSC	General Comments on Well Monitoring Program 1994 Annual Monitoring Report for Tracy
95/07/28	MW	Marshall Cloud	Well Completion Reports Well Abandonment Program Delivery Order 021
95/07/28	MW	CEHND	Comprehensive RI/FS - Phase II and Phase III Analytical Data Report, Vol I, II, & III
95/07/31	Peter B. LeVon, MW	Steve Light	Response To Comments on DDRW Tracy Well Monitoring Program Draft Low-Flow Sampling Study Work Plan
95/07/31	Randy Marx, RC	Steve Light	Submittal of Record of Decision Summary Table
95/08/01	MW	CoE Huntsville	Draft Comprehensive Site-Wide Baseline Risk Assessment
95/08/01	MW	CoE Huntsville	Draft Comprehensive Remedial Investigation/Feasibility Study, Volume 1
95/08/01	MW	CoE Huntsville	Draft Comprehensive Remedial Investigation/Feasibility Study, Volume 2
95/08/01	MW	CoE Huntsville	Draft Comprehensive Remedial Investigation/Feasibility Study, Volume III
95/08/01	MW	DDRW - Tracy	Final Groundwater Model Technical Evaluation, Volume 1
95/08/01	MW	DDRW - Tracy	Final 3-D Groundwater Model Technical Evaluation, Volume 2
95/08/01	PTASI	DDRW - Tracy	Monthly Monitoring Report, August 1995
95/08/01	RC	CoE Huntsville	Draft Engineering Evaluation Cost Analyses (EE/CA) for the Industrial Waste Pipeline, Sewage Lagoons, & Industrial Waste Lagoons for DDRW-Tracy
95/08/01	RC	CoE	DDRW Tracy & Sharpe, CA Delivery Order 006: Community Relations Task Work Task Proposal
95/08/01	RC	CoE Huntsville	UST Site Investigation Work Plan, Draft
95/08/15	Joe Schratz, Calcon Systems, Inc.	Peter Kalush	Tracy DDRW Air Stripper- Valve Failure
95/08/17	Michael Work, USEPA	Marshall Cloud	DDRW Tracy Incomplete RI Submission and EPA's Risk Assessment Comments of July 20, 1995
95/08/18	Steven L. Glaser, MW	Steve Light	Submittal of Draft Comprehensive Site-Wide Risk Assessment Section 6 - Ecological Assessment
95/08/22	Unknown	DDRW Remedial Project Mgrs	Presentation of DDRW Draft Comprehensive RI/FS and BRA Findings to Remedial Project Managers
95/08/24	Michael Work, USEPA	Marshall Cloud	Resolution of Informal Dispute Re DDRW-Tracy Incomplete RI
95/08/25	Michael Work, USEPA	Marshall Cloud	DDRW-Tracy Draft Explanation of Significant Difference for OU-1 ROD (Aug 95)
95/08/27	Unknown	General Public	Public Notice for Agriculture Lease Meeting on September 7, 1995
95/08/28	Michael Work,	Marshall Cloud	Ltr. regarding DDRW Tracy Investigation of AG-2/Lower Tulare

Date	Author	Addressee	Subject
95/08/30	Deborah C.Z. Hirsch, RC	Steve Light	Delivery Order 006: Transmittal of Meeting Minutes and Draft Poster Boards
95/08/30	Steven L. Glaser, MW	Marshall Cloud	Parental Notification Letter, Day Care Center
95/09/01	MW	CoE Huntsville	DDRW-Tracy Operable Unit 1 CPT Technical Memorandum Final Report
95/09/01	MW	CoE Huntsville	DDRW-Tracy 60 Per Cent Remedial Action Work Plan for Operable Unit 1
95/09/01	MW	CoE Huntsville	DDRW-Tracy 60 Per Cent Construction Specifications for Operable Unit 1, Volume II
95/09/01	MW	CoE Huntsville	Interim Groundwater Treatment Expansion Operations & Maintenance Manual
95/09/01	MW	CoE Huntsville	DDRW-Tracy: 60% Remedial Design Report ana Analysis for Operable Unit 1
95/09/01	MW	CoE Huntsville	DDRW-Tracy 60% Construction Specifications Volume 1
95/09/01	RC	CoE Huntsville	DDRW-Tracy Underground Storage Tank Closure Report Draft
95/09/08	Nancy Price, Stockton Record	General Public	Newspaper Article: Feds Looking for A Few Good Farmers for Leases Near Tracy Depot
95/09/09	Scott Howard, The Valley Newspaper	General Public	Day Care Center Discovers Minute Amount of DDT
95/09/09	Stockton Record	General Public	Newspaper Article: DDT Found at Tracy Depot at Day-Care Center
95/09/13	RC	CoE Huntsville	Engineering Evaluation/Cost Analyses (EE/CA) for the Industrial Waste Pipeline, Sew Lagoons, & Industrial Waste Lagoons Draft Final
95/09/14	MW	Steve Light	Original Data Sheets for Phase II DI-WET Data
95/09/14	Peter B. LeVon, MW	Steve Light	Response to comments on DDRW-Tracy Well Monitoring Program
95/09/15	AMCEN-R (MMDIM), Col Mark Porter	DDRW -Tracy	Proposed Easement Acquisitions for Contaminant Plume Management near DDRW - Tracy
95/09/15	Deborah C.Z. Hirsch, RC	Steve Light	Transmittal of Public Meeting Minutes and Copies of Informational Posterboard Sets Prepared for Public Meetings
95/09/18	MW	Marshall Cloud	Modeling Backup to Montgomery's Letter Dated July 18, 1995
95/09/19	Michael Work, USEPA	Mr. Marshall Cloud	DDRW-Tracy's Draft UST Site Investigation Work Plan (Aug 1995)
95/09/20	Deborah C.Z. Hirsch, RC	Steve Light	Transmittal of Public Meeting Minutes & Copies of Informational Posterboards Sets Prepared for Public Meetings
95/09/20	Steven L. Glaser, MW	Steve Light	Day Care Meeting Minutes, September 5, 1995
95/09/22	CPT Will Harmon	Marshall Cloud	Analytical Data Summary Vegetative Layer Barrow Source Sampled on August 17, 1995
95/09/26	CoE	ASCW-BE	Petroleum Contaminated Soil Removal DDRW-Tracy & Sharpe Draft-Draft
95/09/26	RC	CoE Huntsville	Work Task Proposal for the IRM Groundwater Treatment Plant Scale Study, DDRW-Tracy
95/09/26	RC	CoE Huntsville	Work Task Proposal for the Two Phase Extraction Treatability Study, DDRW-Tracy

Date	Author	Addressee	Subject
95/09/29	Curtis & Tompkins, Lts. Analytical Laboratories	Marshall Cloud	Preliminary Results from Analysis of Contaminated Soil @ Tracy Daycare Center
95/09/29	MW	Steve Light	EPA Comments on Human Risk Assessment Technical Memorandum
95/09/30	MW	COE Huntsville	Extended Prove-Out Report Expanded Interim Remedial Measure System, September 1995 1 copy
95/10/04	ASCW-PSM	PTASI	Well Monitoring
95/10/04	Jim Pinasco, DTSC	Marshall Cloud	Quote for Removal of Contaminated Soil @ Tracy Daycare Center
95/10/04	RC	Steve Light	29 Sep 1995 Conference Call Minutes & Monthly Planner for Oct & Nov 1995
95/10/05	PTASI	ASCW-BE Sharpe	Quarterly Monitoring Report, July - September 1995
95/10/05	WMD/C&C&T	Davy International	Test Results for Child Care Center -Tracy Facility
95/10/10	CoE	DDRW-Tracy	Extended Prove-Out IRM, Design Review Comments, May 5, 1995
95/10/10	PTASI	DDRW - Tracy	Monthly Monitoring Report, September 1995 2 copies
95/10/11	Brian K. Davis, Ph.D, DTSC	Jim Pinasco, DTSC	Risk Assessment Evaluation Of DDRW Tracy
95/10/11	RC	CoE	Final Integrated Geographic Information System (IGIS) Implementation Guide
95/10/16	RC	Steve Light	Draft DDRW Tracy's Operable Unit 1 Two Phase Extraction Treatability Study Work Plan
95/10/18	EPA	DDRW-Tracy	Draft Final EE/CA, DDRW Tracy, Removal Action for SWMUs 2,3, and 33
95/10/19	RWQCB	DDRW-Tracy	Draft Underground Storage Tank (UST) Site Investigation Work Plan general comments
95/10/24	ASCW-BE	EPA	Approval of DTSC request for a 30 day comment extension
95/10/24	RWQCB	Jim Pinasco, DTSC	Draft Final Engineering Evaluation/Cost Analyses for the Industrial Waste Pipeline, Sewage Lagoons, and Industrial Waste Lagoons
95/10/25	RC	CEHND	Draft Pesticide Evaluation for Day Care Center (DCC) Technical Memorandum DDRW-Tracy
95/10/26	DTSC	DDRW-Tracy	Engineering Evaluation/Cost Analyses (EE/CA), for the Industrial Waste Pipeline, Sewage Lagoons, and Industrial Waste C-
95/10/26	RC	CEHND	Operable Unit 1, 60 Percent Design Review, DDRW-Tracy, DACA87-95-D-0001
95/10/30	MW	CoE Huntsville	Operable Unit 1, Explanation of Significant Difference for Chg of Groundwater Extraction
95/10/30	RWQCB, Karen Bessett	Marshall Cloud	Draft Final Explanation of Significant Difference for OU 1 ROD, DDRW-Tracy
95/10/31	DDRW-BE	Michael Work, EPA	Decision not to conduct NRDA at DDRW Tracy
95/10/31	RC	CoE Huntsville	Final Operable Unit 1 CPT Study Technical Memorandum, DDRW-Tracy, October 31, 1995 3 copies
95/11/10	RWQCB	DTSC, Jim Pinasco	Draft Comprehensive RI/FS study Report, DDRW-Tracy
95/11/02	Michael Work, USEPA	Marshall Cloud	Draft Final ESD for OU-1 Oct95
95/11/02	Michael Work, USE-PA	Marshall Cloud	Ltr. regarding Draft Final ESD for OU-1 (Oct 95)
95/11/03	Jim Pinasco, DTSC	Marshall Cloud	Draft Comprehensive RI/FS, DDRW Tracy

Date	Author	Addressee	Subject
95/11/03	Michael Work, USEPA	Marshall Cloud	Ltr. regarding Example Proposed Plan
95/11/07	Michael Work, USEPA	Marshall Cloud	Letter regarding Draft Final OU-1 60% Remedial Design (Sep 95)
95/11/08	RD	CoE, Steve Light	Document Submission: Draft Interim Remedial Measure (IRM) Study Work Plan, DDRW -Tracy 3 copies
95/11/09	DTSC, Jim Pinasco	Marshall Cloud	Ltr verifying 30 day extension for comments concerning the Draft Base Wide RI/FS Study Report
95/11/10	PTASI	DDRW-Tracy	Monthly Monitoring Report, Tracy Facility, Report Period October 1995, Report Date November 10, 1995
95/11/13	DTSC, Jim Pinasco	Marshall Cloud	Review of Draft 60% Design for U-1, DDRW-Tracy
95/11/13	Michael Work, USEPA	Marshall Cloud	Ltr. DDRW-Tracy FFA Schedule extension Request for Draft Final Comprehensive RI/FS/PP and Draft ROD
95/11/13	Michael Work, USEPA	Marshall Cloud	Ltr DDRW-Tracy FFA Schedule Extension Request for Draft Final Comprehensive RI/FS/PP and Draft ROD
95/11/13	MW, Roberta Schlicher	CoE, Steve Light	OU 1 Explanation of Significant Difference DDRW-Tracy Revised Draft Final
95/11/13	RC	CoE Huntsville	Final Two Phase Extraction Treatability Study Work Plan
95/11/13	RWQCB, Robert Reeves	DTSC, Jim Pinasco	Comments on the 60% Remedial Design Report & Analysis for OU-1 & 60% Remedial Action Work Plan for DDRW-Tracy.
95/11/14	MW	DDRW-Tracy	DDRW-Tracy Operable Unit 1 Explanation of Significant Difference
95/11/20	Michael Work, USEPA	DDRW-Tracy	Example Table Format for Risk Assessment Uncertainties
95/11/22	RC	CoE, Steve Light	Draft Underground Storage Tank Closure Report, DDRW-Tracy
95/11/29	AMCEN-R	ASCW-BE	Proposed Easement Acquisitions for Contaminant Plume Management Near the DDRW-Tracy
95/12/02	RC	CoE, Steve Light	Draft Environmental Master Plan, DDRW-Sharpe and DDRW-Tracy
95/12/04	CoE	DDRW-Tracy/Sharpe	Draft-Draft Site Visit, Petroleum Contaminated Soil Removal.
95/12/08	RC	CoE, Steve Light	Work Task Proposal for Tracy Well Management Project
95/12/12	Michael Work, USEPA	Marshall Cloud	Ltr. OU-1 Remedial Design 60%
95/12/14	RWQCB	Marshall Cloud	Well Abandonment Engineering Report for DDRW-Tracy
95/12/14	RWQCB, Robert Reeves	ASCW-BE	Well abandonment Engineering Report, DDRW-Tracy
95/12/15	RC, Slavich	CoE, Steve Light	Final Pesticide Evaluation for Day Care Center Technical Memorandum DDRW-Tracy
95/12/19	RC	ASCW-BE	Minutes RPM meeting Dec 5-7, 1995
95/12/20	MW, Robert Schlicher	CoE, Sieve Light	OU-1 Explanation of Significant Difference, DDRW-Tracy Final
95/12/20	RWQCB	DDRW-Tracy	Notice, Tentative Waste Discharge Req. for Tracy OU-1 Groundwater Treatment System

Date	Author	Addressee	Subject
95/12/20	RWQCB, Karen Bessett	ASCW-BE	DDRW-Tracy Groundwater Treatment System, Nov. 95 Report
95/12/29	ASCW-BE, Marshall Cloud	RWQCB, Karen Bassett	Ltr stating need for more analytical data to evaluate pesticide problem in groundwater at DDRW-Tracy
95/12/29	RC, Slavich	CoE, Steve Light	Draft Soil Stockpile Disposal Evaluation for Day Care Center Technical Memorandum DDRW-Tracy
96/01/01	MW	CoE	95% Construction Cost Estimate OU-1
96/01/01	RC	DDRW-Tracy	Well Abandonment/Well Installation (Addendum to DDRW-Sharpe Tracy Master Work Plan) Well Management Task, January 1996
96/01/01	RC	CoE	Draft Sampling and Analysis Plan for SMWUs 2 and 3
96/01/02	RC	CoE	Draft Sampling and Analysis Plan for SWMUs 2 & 3
96/01/05	MW	CoE, Huntsville	100 Percent Design Submittal
96/01/05	MW	CoE	95% Design Submittal
96/01/05	MW, Roberta Schlicher	CoE	95 Percent Remedial Design Report and Analysis for OU-1
96/01/06	MW	CoE	95 Percent Construction Specifications, OU-1 Remedial Design, Vol I & 11, Tracy
96/01/06	MW	CoE	Final Remedial Action Work Plan for Operable Unit 1, Tracy
96/01/10	RC	CoE, Steve Light	Draft OU 1 Two Phase Extraction Treatability Study Summary Report, January 1996
96/01/12	ASCW-BE	RWQCB, Karen Bessett	Ltr with Dec 95 report for DDRW-Tracy Groundwater Treatment System
96/01/12	PTASI	ASCW-BE	Monthly Monitoring Report for December 1-31, 1995.
96/01/13	RC	CoE	Delivery Order 12 Well Monitoring Work Task Proposal
96/01/15	RC	CoE, Steve Light	Draft Master Work Plan (Well Management), Sharpe and Tracy
96/01/16	ASCW-BE, Marshall Cloud	Michael Work, EPA	Ltr. requesting 208 day extension for Draft/Final Risk Assessment, RI/FS, Proposed Plan, and ROD
96/01/17	ASCW-BE, Marshall Cloud	DTSC, Jim Pinasco	Ltr. requesting 208 day extension for Draft/Final Risk Assessment, RI/FS, Proposed Plan, and ROD
96/01/17	ASCW-BE, Marshall Cloud	RWQCB, Karen Bessett	Ltr. requesting 208 day extension for Draft/Final Risk Assessment, RI/FS, Proposed Plan and ROD
96/01/1	ASCW-BE	EPA, DTSC, RWQCB, CoE, MW, RC	Revised Delivery Schedule tor Risk Assessment, RI/FS, PP and ROD
96/01/19	ASCW-BE	EPA, DTSC, RWQCB, CoE, MW, RC	Fax notifying PMM Feb 1, 1996 at Montgomery Watson
96/01/19	MW	CoE	OU-1 Explanation of Significant Difference, DDRW-Tracy
96/01/19	MW	CoE	Meeting Notes for RPM Meeting February 1, 1996.

Date	Author	Addressee	Subject
96/01/22	RWQCB, Antonia Vorst	Marshall Cloud	Project Manager for DDRW-Tracy be Robert Reeves while Karen Bessette is on leave, 1- 15-96 to 7-1-96.
96/01/24	Michael Work, USEPA	Marshall Cloud	DDRW-Tracy FFA Schedule Extension Request
96/01/24	RC, Slavich	Steve Light	Regulatory Agency Comment Responses for Draft Final Engineering Evaluation/Cost Analyses
96/01/24	RWQCB	DTSC, Jim Pinasco	FFA Time Schedule Extension Request, DDRW-Tracy ltr.
96/01/25	RWQCB	DDRW-Tracy	Tracy WDR's, RWQCB Meeting Agenda for January 25, 1996
96/01/26	MW	CoE	Final Well Monitoring Program Low-Flow Sampling Study Report January 1996
96/01/26	MW	CoE	OU-1 Pesticides Consensus Statement, DDRW-Tracy
96/01/20	RC	Steve Light	Draft Site-Specific Health and Safety Plan, Sewage Lagoon (SWMUs 2 & 3) Soil Sampling
96/01/26	RC	CoE	Final Engineering Evaluation/Cost Analysis (EE/CA) for the Industrial Waste Pipeline, Sewage Lagoons, and Industrial Waste Lagoons
96/01/26	RC	CoE	Delivery Order 12/13-Preliminary Draft Well Monitoring Program Work Plan Addendum-QAPP
96/01/29	Michael Work, USEPA	Marshall Cloud	EPA comments on DDRW-Tracy 95% RD Report OU-1 (Jan 96)
96/01/29	RC	CoE	Comments on OU-1, 95% Design Review, DDRW-Tracy
96/01/29	RWQCB	DTSC, Jim Pinasco	Comments, 95% Design Report for Groundwater OU-1, DDRW-Tracy
96/01/30	Hunter Surveying, Inc.	ASCW-BE	Record of Survey, portion of Sec. 26.2S., R.5E., M.D.B. & M. San Joaquin Country, CA MAP
96/01/30	Hunter Surveying, Inc.	ASCW-BE	MAP, Record of Survey a portion of section 35, T.2S., R.5E.,M.D.B. & M. San Joaquin Country - CA
96/01/31	RC	CoE	DDRW-Sharpe and Tracy, Mod-A Draft Work Task Proposal for Underground Storage Tank (UST) Project
96/01/31	RC	CoE	Delivery Order 12/13-Preliminary Draft Well Monitoring Program Work Plan Addendum
96/02/01	MW, Sue Tiffany	ASCW-BE	Draft Action Mem for Rem Act, at Ind Waste Ppln, Sew. Laget
96/02/01	PTASI	DDRW-Tracy	Quarterly Monitoring Report; Report Period Oct-Dec 1995 Report Date: February 1996
96/02/05	RC	CoE	Draft Action Memorandum for Removal Actions at the Industrial Waste Pipeline, Sewage Lagoons and Industrial Waste Lagoons
96/02/05	RC	CoE, Huntsville	Draft Action Memorandum for Removal Actions
96/02/05	RWQCB	Marshall Cloud	Notice of Adoption of Waste Discharge Requirements & Initial Study & Negative Declaration for DDRW-Tracy OU-1 Groundwater Treatment System
96/02/05	Marshall Cloud	CoE	Comments OU 1 Two Phase Extraction Treatability Study Summary Report
96/02/19	RC	CoE	January Monthly Treatment Plant Performance Monitoring Report
96/02/20	ASCW-BE	CAAE, Dennis Lillo	Request for meetings to discuss IGIS and Low Flow groundwater sampling program
96/02/21	ASCW-BE	Regulators	Fax Project Managers Meeting Feb 29, 1996
96/02/22	Michael Work, USEPA	Marshall Cloud	Ltr. Final EE/CA for Ind. Waste Pipeline, Sewage Lag. & Ind. Waste Lag. Draft Sampling & Analysis Plan for SWMUs 2 & 3.
9/02/22	Stockton Record	ASCW-BE	Proof of Publication on EECA for three Tracy Solid Waste Management Unit Sites

Date	Author	Addressee	Subject
96/02/23	RC	CEHNC-PM-ED	Final Addendum #2 to Comprehensive Field Work Plan for DDRW-Tracy/Sharpe, Sampling and Analysis Plan for SWMUs 2 and 3.
96/02/23	RC	CEHNC-PM-ED	Comment Responses for Sampling and Analysis Plan/Health and Safely Plan
96/02/23	RC	CoE	Final Soil Stockpile Disposal Evaluation for Day Care Center Technical Memorandum
96/02/23	South Pacific Div. Lab	CoE Huntsville	QA Testing, 4th Quarter CY95, Interim Reports for Total Mercury for LM123B, EWA-08, MW402C LM30AA, LM38A, LM99A, LM102B
96/02/27	MW	CoE	Ltr. DDRW-Tracy Background Agreements
96/02/29	RWQCB	DTSC	EE/CA for the Industrial Waste Pipeline, Sewage Lagoons & Ind Waste Lagoons, Draft Sampling & Analysis Plan & Action Memo for Removal Actions, DDRW-Tracy
96/03/04	RC	CoE	Draft Comprehensive Field Work Plan March 1996, Vol I & II
96/03/04	RC	CoE	Draft Well Monitoring Work Plan, Addendum No. 4 to the Comprehensive Field Work Plan
96/03/05	ASCW-BE	RWQCB, Karen Bessette	Ltr enclosing Monthly Waste Discharge Requirement Order # 96-021 Report for DDRW-Tracy for Jan 1996.
96/03/08	RC	CoE	Draft Solidification Treatability Study Work Plan for SWMUs 2 & 3
96/03/08	RC	CoE	Draft Request for Temporary Operating Change Waste Discharge Requirements for DDRW-Tracy Wastewater Treatment Plant, San Joaquin County
96/03/12	MW	CoE	Meeting minutes and videotapes from Feb 29, 1996 Tracy Program Managers Meeting; Formal response to comments on the Draft RI/FS
96/03/13	RC	CoE	Delivery Order 12-Work Task Proposal for Tracy Well Monitoring Program
96/03/14	RC	CoE	95% Construction Cost Estimate OU-1
96/03/14	RC	CoE	February Groundwater Treatment Plant Monthly Performance Monitoring Report, DDRW-Tracy
96/03/14	RWQCB	ASCW-BE	Underground Storage Tank Closure Report, DDRW-Tracy
96/03/18	RC	CoE	Draft UST Site Investigation Work Plan, Add. 6 to the Comp. Field Work Plan for DDRW-Sharpe/Tracy
96/03/19	ASCW-BE	RWQCB, Karen Bessette	Ltr with report for DDRW-Tracy Groundwater Treatment System, February 1996
96/03/21	RC	CoE	Modification A-Final Work Task Proposal for Underground Storage Tank Project, DDRW-Sharpe and DDRW-Tracy
96/03/28	ASCW-BE	Regulators, CEHNC, MW, RC, CoE-Sac	RPM Meeting announcement for Apr 18-19, 1996, DDJC, 9:30 am
96/03/29	PTASI	ASCW-BE, John Guzman	Sharpe/Tracy Project CDAP/Work Plan Revisions for Monitoring Well Sampling & Analyses at DDRW Tracy Site
96/04/01	ASCW-BE	CoE Regulators	Project Manager's Meeting to be held April 18-19, 1996 at the Tracy site
96/04/01	MW	CoE, Huntsville	100 Percent Construction Specifications Vol I & II, DDRW-,Tracy, April 1996
96/04/01	MW	CoE, Huntsville	Final Operable Uni1 Remedial Action Design Report and Analysis

Date	Author	Addressee	Subject
96/04/09	Michael Work, USEPA	Marshall Cloud	EPA Comments on Response to EPA Comments on the Comprehensive RI/FS for DDRW-Tracy
96/04/12	RC	CoE, Huntsville	Final Action Memorandum for Removal Actions at the Industrial Waste Pipeline, Sewage Lagoons, and Industrial Waste Lagoons
96/04/12	RC	CoE, Huntsville	Comment Responses For Final EE/CA, Draft Action Memo for Removal Actions at the Ind. Waste Pipeln, Sewage Lagoons, and Ind Waste Lagoons, & Draft Sampling & Ana. Plan SWMUs 2 & 3
96/04/12	RC	CoE, Huntsville	March Monthly Treatment Plant Performance Monitoring Report, DDRW-Shapre/Tracy
96/04/16	RC	CoE, Huntsville	Preliminary Draft DDRW-Tracy Well Monitoring Program, 1995 Annual Monitoring Report
96/04/18	RC	CoE, Huntsville	Draft UST Site Investigation Field Work Report for DDRW Tracy.
96/04/21	MW	CoE, Huntsville	Final Update Construction Cost Estimate OU 1, DDRW-Tracy April 1996
96/04/26	RC	CoE, Huntsville	Draft Preferred Alternatives Report for UST Sites 7,9, 10 & 20
96/04/30	MW	CoE, Huntsville	
96/04/30	RC	CoE Huntsville	RPM meeting minutes for April 18, 1996
96/05/10	RWQCB	Marshall Cloud	Notice of Amended Waste Discharge Requirements for DDRW-Tracy Wastewater Treatment Plant
96/05/14	MW	CoE, Huntsville	Submittal of Response to Comments on Draft Comprehensive Site-Wide Baseline Risk Assessment & Tech Memo, Human Health Risk Assessment at Exposure Units 1, 2, and 7.
96/05/14	RC	CoE, Huntsville	April Monthly Treatment Plant Performance Monitoring Report (Well Monitoring), DDRW-Sharpe
96/05/14	RC	CoE, Huntsville	Final Underground Storage Tank Closure Report for DDRW-Tracy
96/05/15	ASCW-BE	Property owners adjacent to Tracy Site	Ltr with test results for Oct-Dec, 1995
96/05/17	RC	CoE, Huntsville	Ltr with report submission-Well Monitoring Program Quarterly Monitoring Report First Quarter 1996 Sampling Round, DDRW-Sharpe & Tracy
96/05/17	RC	CoE, DTSC, RWQCB,EPA	Well Monitoring Program Quarterly Monitoring Report First Quarter 1996 Sampling Round, DDRW Tracy and Sharpe
96/05/20	COE, Huntsville	Marshall Cloud	Map,Topographic Surveys of Sewage Lagoons, Industrial Waste Lagoons, & Industrial Waste Pipeland
96/05/20	RC	CoE, Huntsville	Del Order 0004,60% Removal Action Design for SWMUs 2, 3, and 33 Drawings, Specifications and Design Analysis Report (2 Books)
96/05/20	RC	CEHNC	Cone Penetrometer Testing-CPT Results, DDRW-Tracy (Robertson Property)
96/05/28	EPA	Marshall Cloud	EPA Comments on DDRW-Tracy's 100 percent RD for OU-1
96/05/31	ASCW-BE	RWQCB, Karen Bessette	April 96 Report for DDRW-Tracy Groundwater Treatment System
96/06/01	DDRW-Tracy	Public, Residents	Fact Sheet #1, Environmental Update, Depot Uses Environmental Evaluation/Cost Analysis (EE/CA) to Speed Cleanup at Three Waste Sites
96/06/06	RC	ASCW-BE	Administrative Record Audit, DDRW Sharpe/Tracy

Date	Author	Addressee	Subject
96/06/06	RC	ASCW-BE, John Guzman	Administrative Record Audit for DDRW Sharpe Tracy
96/06/11	RC	CoE, Huntsville	IGIS User Guides, Final
96/06/12	ASCW-BE	Regulators, CEHND, MW, RC	RPM Meeting invitation for July 15-16,1996, DDSJ
96/06/14	RC	CoE, Huntsville	Final Comprehensive Field Work Plan, DDRW-Sharpe & DDRW-Tracy Vol I -Text & Vol 2-QAPP
96/06/14	RC	CoE, Huntsville	May 1996 Monthly Treatment Plant Performance Monitoring Report (Well Monitoring)
96/06/17	ASCW-BE	RWQCB, Karen Bessette	Ltr. accompanying Monthly Report for Monitoring and Reporting Order No. 96 for May 1996
96/06/18	RC	CoE, Huntsville	Final UST Site Investigation Field Work Report for DDRW-Tracy
96/06/20	MW	Marshall Cloud	Low Flow Pump Preliminary Analysis
96/06/20	RC	CoE	Draft Hazardous Material Storage Addition to Warehouse 28 Environmental Assessment
96/06/24	Michael Work, USEPA	Marshall Cloud	EPA Comments on DDRW-Tracy's 60% Removal Action Design for SWMUs 2, 3, and 33, May 1996
96/06/28	RC	CoE, Huntsville	Draft Well Monitoring Program 1995 Annual Monitoring Report
96/06/29	RC	CoE, Huntsville	Draft Child Care Facility Closure
96/07/01	RC	CoE, Huntsville	90% Removal Action Design for SWMUs 2, 3, and 33 Design Analysis Report
96/07/01	USEPA	DTSC, RWQCB, ASCW-BE	Ltr Informant Dispute, DDRW-Tracy Comprehensive RI/FS Baseline Risk Assessment (BRA) and added comments from July 8, 1996 conference call
96/07/12	RC	ASCW-BE	Final Draft Administrative Record Assessment Report
96/07/12	RC	CoE, Huntsville	Groundwater Treatment Plant Monthly Performance Monitoring Report - June
96/07/12	RC	COE, Huntsville	Groundwater Treatment Plant Monthly Performance Monitoring Report - June 1996
96/07/15	RC	CoE, Huntsville	90% Removal Action Design for SWMUs 2, 3, and 33 Specifications
96/07/15	RC	Regulators	DDRW-Tracy OU-1 Well Installation Status
96/07/15	RC	CoE, Huntsville	Comments from RWQCB to include in Final UST Site Investigation Work Plan
96/07/19	RC	CoE, Huntsville	Draft Waste Management Plan, DDRW-Sharpe and Tracy
96/07/19	RC	CoE, Huntsville	Draft Waste Management Plan, Sharpe and Tracy
96/07/22	ASCW-BE	RWQCB, Karen Bessette	Ltr attached to Tracy site monthly Monitoring Report for June 1-30, 1996
96/07/22	RC	CoE, Huntsville	Well monitoring Program Quarterly Monitoring Report Second Quarter 1996 Sampling Round, DDRW-Sharpe and DDRW-Tracy
96/07/23	ASCW-BE	CoE, Steve Light	DDRW Tracy Air Stripper Scaling Problem
96/07/23	Michael Work,	Marshall Cloud USEPA	EPA Input to DDRW-Tracy's Comprehensive RI/FS/BRA
96/07/29	ASCW-BE	Tracy Residents	Test Results from drinking water wells, Jan-Mar 1996
96/07/31	RC	CoE, Huntsville	Final Well Monitoring Program Field Work Plan

Date	Author	Addressee	Subject
96/07/31	RWQCB	ASCW-BE	Ltr Well installation Work Plan, DDRW-Tracy
96/08/01	EPA	ASCW-BE	Region 9 Preliminary Remediation Goals (PRGs) 1996
96/08/05	Michael Work, USEPA	Marshall Cloud	Ltr Response to EPA Comments, Final Comprehensive RI/FS Phase II & III Analytical Data Report
96/08/05	RC	CoE, Huntsville	Draft OU I Repairs and Enhancements Work Plan
96/08/07	ASCW-BE	RWQCB Karen Bessette	Ltr with info closure of USTs
96/08/07	ASCW-BE	RWQCB, DTSC, EPA	Transmittal page with Final Well Monitoring Program Field Work Plan
96/08/08	MW	CEHND	Draft Final Comprehensive Site-Wide Baseline Risk Assessment
96/08/12	ASCW-BE	EPA, Michael Work	Ltr requesting two day extension from 8/13/96 to 8/15/96 for DDRW-Tracy Draft Final Comprehensive Remedial Investigation Feasibility Study
96/08/12	CEHND	MW	Revised Final Comprehensive RI/FS - Phase II and Phase III Analytical /Data Report to Vol I-III
96/08/12	RC	ASCW-BE	RPM Meeting Minutes for July 15-16, 1996
96/08/13	MW	DTSC	Draft Final Baseline Risk Assessment
96/08/13	MW	DTSC	Ltr w/Draft Final Baseline Risk Assessment
96/08/13	RC	CEHND	July monthly Treatment Plant Performance Monitoring Report, DDRW-Tracy
96/08/14	MW	CEHND	Comprehensive Draft Final RI/FS Vol I-III
96/08/15	EPA	ASCW-BE	Response to Tracy's request for a 2-day FFA schedule extension, Comprehensive RI/FS/BRA/PP Extension approved to 8/15/96.
96/08/15	RC	CoE	Final Preferred Alternatives Report for UST Sites 7,9, 10, and 20
96/08/16	RC	CoE, Huntsville	Draft Final Environmental Master Plan
96/08/16	RC	CoE, Huntsville	Final Waste Management Plan (Addendum to Comprehensive Field Work Plan for Sharpe/Tracy
96/08/18	MW	COE	Response to Comments Received on the Draft Comprehensive RI/FS
96/08/21	ASCW-BE	RWQCB	Tracy Monthly Report for Monitoring and Reporting Order for July 1996
96/08/21	ASCW-BE	RWQCB	Ltr scaling problem with air stripping system, Tracy Site
96/08/30	RC	CoE, Huntsville	Final OU-I Repairs and Enhancements Work Plan
96/09/06	MW	RWQCB	Ltr Aerial Photos at DDRW-Tracy
96/09/06	RC	COE, Huntsville	Draft Final Administrative Record Assessment
96/09/06	RC	COE, Huntsville	Final Child Care Facility Closure Report, DDRW-Tracy
96/09/06	RC	COE, Huntsville	Modification 2, OU I Repairs and Enhancements, PLC I/O Point Lists
96/09/06	RC	CEHNC	Final Drum Storage Facility Environmental Assessment
96/09/09	EPA	DDRw-Tracy	DDRW-Tracy Well Monitoring Program, Quarterly Monitoring Report Second Quarter 1996 Sampling Round, July 1996
96/06/12	ASCW-BE	Regulators, Radian,	Announcement of RE/FS Approval Meeting for Oct 9-10, 1996 to discuss outstanding issues only.

Date	Author	Addressee	Subject
96/09/13	RC	CoE, Huntsville	Groundwater Treatment Plant Monthly Performance Monitoring Report-August
96/09/13	RC	CEHNC	Final Hazardous Material Storage Addition to Warehouse 28 Environmental Assessment
96/O9/17	RC	CEHNC, DDRW-Tracy	Technical Memorandum Maintenance of Existing Low Flow Pumps-Summary and Results
96/09/19	RC	CEHNC	DDRW-Tracy Solidification Treatability Study
96/09/26	EPA	DDRW-Tracy	Ltr Draft Comprehensive RI/FS/BRA/PP DDRW-Tracy, Aug 96
96/09/27	ASCW-BE	RWQCB	Monthly Monitoring Report for Aug 1-31, 1996
96/10/01	RC	CoE, Huntsville	Final DDRW-Tracy Well Monitoring Program, 1995 Annual Monitoring Report
96/10/03	ASCW-BE	RWQCB	Ltr to describe calcium carbonate scaling problem with air stripper and action taken to improve.
96/10/04	RC	CEHNC	Draft Waste Water Treatment Plant Effluent Diversion, Drawings and Specifications
96/10/10	MW	CEHNC	Draft Groundwater Treatment System Optimization Work Plan
96/10/14	RC	CEHNC	Groundwater Treatment Plant Monthly Performance Monitoring Report-September 1996
96/10/15	EPA	ASCW-BE	Fax questioning review period for ROD documents
96/10/16	ASCW-BE	RWQCB, Karen Bessette	Ltr with Tracy Monthly Monitoring and Reporting Order 96 for Sep, 1996
96/10/18	Michael Work,	Marshall Cloud USEPA	DDRW-Tracy Extension, Comprehensive RI/FS
96/10/21	ASCW-BE	EPA, Michael Work	Ltr Proposed document extension dates.
96/10/21	MW	CoE, Huntsville	Meeting /Telecons Conducted Oct 9, 10, 15, 18, 1996
96/10/29	Michael Work, USEPA	ASCW-BE	Ltr DDRW-Tracy Extension for the Comprehensive RI/FS/PP/BRA
96/10/31	RC	ASCW-BE	Draft Environmental Program Status Briefing Report October, 1996, DDRW-Tracy
96/10/31	RC	CEHND	Well Monitoring Program Quarterly Monitoring Report Third Quarter 1996 Sampling Round
96/11	Radian	CoE, Huntsville	Final Comprehensive Site-Wide Proposed Plan.
96/11/01	MW	CEHNC	Final DDRW-Tracy Response to Comments oil the Draft Final Comprehensive RI/FS Nov 1996
96/11/01	MW	CEHNC	Proposed Plan Information Booklet
96/11/04	Davy International Environmental Division	CoE, Sacramento	Draft Project Work Plan, DDRW-Sharpe & Tracy, Petroleum Contaminated Soil Removal
96/11/05	RWQCB	ASCW-BE	Fax Comprehensive RI/FS Documentation - COC's to be considered for clean up levels.
96/11/06	ASCW-BE,	CEHNC, DTSC, RWQCB, EPA, RC	Fax Notice of Projected Managers Meeting November 29-21, 1996
96/11/08	RWQCB	ASCW-BE	Fax feedback on draft response to comment Comprehensive RI/FS Report
96/11/12	RC	CEHNC	Groundwater Treatment Plant Operation and Maintenance Monthly Progress Report for October 1996
96/11/12	RC	CEHNC	Groundwater Treatment Plant 0& M Monthly Progress Report for Oct 1996, DDRW-Sharpe/Tracy
96/11/18	RC	CEHNC	Groundwater Treatment Plant Monthly Performance Monitoring Report-October

Date	Author	Addressee	Subject
96/11/21	MW	CEHNC	Final Comprehensive RI/FS, Appendix R: Comprehensive Site-Wide Baseline Risk Assessment Vol V November 1996
96/11/25	ASCW-BE	RWQCB	Ltr Tracy Monthly Report for Monitoring and Reporting Order No. 96 for Oct, 1996
96/11/26	ASCW-BE	RWQCB, Karen Bessette	Ltr request variance of Waste Discharge Requirement for the groundwater pump & treat operation, Tracy
96/11/26	RC	CEHNC	Revision ltr re: OU I Repairs and Enhancements Work Plan August 1996
96/11/27	RC	CEHNC	Technical Memorandum of DDRW Tracy Storm Water Pond Investigation
96/11/27	RC	CEHNC	Report of Field Activities and Results for Samples Collected at the DDRW-Tracy Storm Water Pond
96/11/27	RC	CEHNC	Ltr Report of Field Activities and Results for Samples Collected at the DDRW-Tracy Storm Water Pond
96/11/27	RC	COE	Ltr Report of Field Activities and Results for Samples Collected at the DDRW-Tracy Storm Water Pond
96/12/02	EPA	ASCW-BE	Ltr DDRW-Tracy Well Monitoring Program, Quarterly Monitoring Report
96/12/02	RC	CEHNC	Final Waste Water Treatment Plant Effluent Diversion Drawings and Specifications November 1996
96/12/10	RC	CEHNC	Environmental Master Plan Version 1.0, DDRW-Sharpe/Tracy, December 1996
96/12/12	RC	CEHNC	Groundwater Treatment Systems Operation and Maintenance Monthly Update Report-November
96/12/13	EPA	ASCW-BE	Ltr EPA Comments on the Replacement Pages for the Comprehensive RI/FS for DDRW-Tracy
96/12/13	RC	CEHNC	Draft Well Monitoring Program 1996 Annual Monitoring Report
96/12/13	RC	CoE, Huntsville	Project Manager's Meeting Minutes for Dec 4-5, 1996
96/12/13	RWQCB	ASCW-BE	RWQCB comments to RI/FS for Tracy site
96/12/16	DTSC,Jim Pinasco	DTSC, Brian Davis	Ltr DDRW-Tracy Draft Response to Draft Final Comprehensive RE/FS for Nov 96
96/12/17	RC	CoE	Final Scale Study Report for DDRW-Sharpe and DDRW-Tracy
96/12/19	ASCW-BE	ASCW-BPM/ASCW-WG	Proposed Rail Over Crossing at DDRW-San Joaquin, Tracy Site
96/12/18	RC	CoE	November Monthly Plant Performance Monitoring Report (Well Monitoring)
96/12/18	RC	CoE	November Monthly Treatment Plant Performance Monitoring Report (well Monitoring), DDRW-Tracy
96/12/19	ASCW-BE	RWQCB	Monthly Monitoring Report for Nov 1996
96/12/19	ASCW-BE	SJCPHS	Ltr with Quarterly Monitoring Report
96/12/19	ASCW-BE	RWQCB	Tracy Monthly Monitoring and Reporting Order No. 96 for Nov 1996
96/12/19	RC	EPA, RWQCB, DTSC	Ltr with Submission of Technical Memorandum for DDRW-Tracy Storm Water Pond Field Effort
96/12/21	MW	CEHNC	Final Comprehensive RI/FS Vol I-III November 1996
96/12/31	EPA	ASCW-BE	First Quarter 1997 Groundwater Sampling Event/Recommendations DDRW-Tracy
96/12/31	Pacific Legacy	DDRW-DDJC Tracy Site	Final Archeological & Architectural Inventory & Evaluation fr the DDJC Tracy Site
97/01/02	RC	DTSC	Ltr Preliminary Recommendations for 1997 Groundwater Monitoring Program DDRW-Tracy
97/01/03	Radian	CoE, Huntsville	Prelim Draft Well Monitoring Program Field Work Plan, DDRW-Sharpe/Tracy
97/01/06	RC	CoE	Draft Acid Cleaning Work Plan (January 1997)

Date	Author	Addressee	Subject
97/01/08	RC	CoE, Huntsville	Draft Comprehensive Record of Decision for Tracy
97/01/09	RC	CoE, Huntsville	Final Groundwater Treatment System Optimization Work Plan for DDRW-Sharpe/Tracy
97/01/14	DTSC	ASCW-BE	Ltr comments Final Comp RI/FS, DDRW-Tracy
97/01/15	RC	CoE	Groundwater Treatment Systems Operation & Maintenance Monthly Update Report-December
97/01/16	RC	CoE	Groundwater Treatment Plant Monthly Performance Monitoring Report - December 1996
97/01/17	ASCW-BE	RWQCB	Ltr request modification of the WDR. Change for Monuron or Diuron to meet achievable levels.
97/01/20	RC	CoE	Response to Comments on the DDRW-Tracy Well Monitoring Prog. Qtrly Mon Rep., Second Qrt 96 Sampling Round & Tracy Well Monitoring Prog Qrt Mon. Rep, Third Qtr 96 Sampling Round
97/01/21	RC	CoE	Final Site Remediation for the Sewage & Industrial Waste Lagoons, & the Industrial Waste Pipeline Drawing & Specifications January 97
97/01/22	Davy Int.	CoE, Sacramento	Final Project Work Plan Sharpe/Tracy, Petroleum Contaminated Soil Removal
97/01/22	EPA	ASCW-BE	Draft Ltr Finalization of Tracy Comp RI/FS, Comments on Overall Quality of Doc, Counsel Comments EPA-Need for Res of Env Issue from Tech Memo on the Storm Water Pond
97/01/24	EPA	ASCW-BE	Ltr, Finalization of Tracy Comp RI/FS, Comments on Overall Quality of Doc., EPA Region 9 Counsel Comments, Need for Resolution of Env Issue Raised in Tech Memo for Storm Water Pond
97/01/27	ASCW-BE	RWQCB, Karen Bessette	Cover ltr for Tracy's monthly report for Monitoring & Reporting Order #96.
97/01/27	RC	CoE	Final 100% Design Site Remediation for the Sewage & Industrial Waste Lagoons, & the Industrial Waste Pipeline Design Analysis Report January 97
97/01/31	DDRW-DP	Public, residents near Tracy	Special Announcement letter inviting public to the Proposed Plan Update and soliciting TRC members
97/01/31	RC	CoE, Huntsville	Draft Site-Wide Comprehensive Record of Decision for DDRW-Tracy
97/10/31	RC	CoE, Huntsville	Draft Engineering Technical Memorandum OU-1 Well Installation - January 1997
97/02/04	ASCW-BE	Public	Mailer with Fact Sheet #2, the Proposed Plan info and the Special Announcement letter from the Commander
97/02/06	ASCW-BE	RWQCB	Transmittal re Waste Discharge Requirements Order #96-122
97/02/10	RC	CoE, Huntsville	Groundwater Treatment Systems Operation & Maintenance Monthly Update Report - January
97/02/10	RC	CoE, Huntsville	Final Acid Cleaning Work Plan for DDRW-Tracy
97/02/11	Radian	CoE, Huntsville	Draft Low-Flow Sampling System Installation Work Plan
97/02/13	ASCW-BE	Tracy private well residents	Results for samples taken July - September 1996.
97/02/18	Radian	CoE, Huntsville	January 1991 Monthly Treatment Plan Performance Monitoring Report (Well Monitoring) DDRW Tracy
97/02/19	Peters Shorthand Reporting	ASCW-BE	February 19, 1997 Meeting Minutes for Proposed Plan for the Final Cleanup Project
97/02/24	EPA	ASCW-BE	Draft Annual Monitoring Report 1996 DDRW-Tracy
97/02/25	CoE, Sac	ASCW-BE	Final Warehouse 28 Well Replacement DDJC, Tracy Site

Date	Author	Addressee	Subject
97/03/05	ASCW-BE	RWQCB	Ltr to accompany Jan 97 Monthly Plant Performance Monitoring Report (Well Monitoring) DDRW-Tracy
97/03/06	Mont Watson	CoE, Huntsville	Response to comments and slip Sheets On O&M Manual
97/03/06	Mont Watson	CoE, Huntsville	Response to comments & slip sheets on Extended Prove-out Report
97/03/07	Radian	CoE, Huntsville	Groundwater Treatment systems Operation and Maintenance Monthly Update Report for Dec 96
97/03/07	Radian	CoE, Huntsville	Acid Cleaning Evaluation and Prove-Out, (Technical Memorandum)
97/03/10	CoE, Sac	ASCW-BE	Ltr OU-I Contract Award
97/03/10	Radian	CoE, Huntsville	Final Well Monitoring Program Field Work Plan DDRW-Sharpe/Tracy
97/03/11	ASCW-BE	CoE, Huntsville	Response to EPA draft Annual Monitoring Report Comments
97/03/18	Radian	CoE, Huntsville	Groundwater Treatment Plant Monthly performance Monitoring Report - February
97/03/24	Radian	CoE, Huntsville	Final Low-Flow Sampling System Installation Work Plan for DDRW-Sharpe/Tracy
97/03/26	ASCW-BE	CoE, H & CoE Sac Real Est	Ltr DDRW Tracy Railroad Easement Requirements
97/03/28	ASCW-BE	DTSC	Ltr: Draft Record of Decision
97/03/28	Radian	CoE, Huntsville	Final Well Monitoring Program 1996 Quality Assurance Procedures Technical Memorandum
97/03/31	Radian	CoE, Huntsville	Preliminary Draft Groundwater Treatment System Optimization Engineering Technical Memorandum, DDRW-Sharpe/Tracy
97/04/01	ASCW-BE	RWQCB	Ltr with Tracy's monthly report for Monitoring & Reporting Order No. 96 for Feb, 1997
97/04/01	DTSC	ASCW-BE	Ltr Extension for comments concerning the Draft Site-Wide Comprehensive ROD, DDRW-Tracy Site
97/04/10	ASCW-BE	Residents	Private Well Test Results for Oct - Dec 1996
97/04/10	Radian	CoE, H	Groundwater Treatment Systems Operation & Maintenance Monthly Update Report - March
97/04/16	Radian	CoE, H	Groundwater Treatment Plant Monthly Performance Monitoring Report - March 97
97/04/17	ASCW-BE	Residents	Ltr Test Results from Private Wells for Jan - Mar 1997
97/04/23	Radian	CoE, S	OU-I Groundwater Treatment System, Project Work Plan
97/04/25	ASCW-BE	RWQCB	Ltr Monthly Report for Monitoring for March 1997
97/04/29	Radian	CoE, H	Well Monitoring Program Well Sampling Data Sheets Fourth Quarter 1996 Sampling Round
97/04/29	Radian	CoE, H	Well Monitoring Program 1996 Annual Monitoring Report
97/05/05	EPA	ASCW-BE	Ltr Five Year Review
97/05/07	ASCW-BE	TRC Members	Ltr TRC Meeting Date and Committee Member Acceptance
97/05/12	Radian	ASCW-BE	Map of Proposed Robertson Wells
97/05/15	Radian	CoE, II	Systems Operation & Maintenance Monthly Update Report-April for Sharpe & Tracy
97/05/16	Radian	CoE, II	Ground water Treatment Plant Monthly Performance Monitoring Report - April
97/05/19	COE'S	ASCW-BE	Site Remediation for the Sewage & Industrial Waste Lagoons, and the Industrial Waste Pipeline, Scope & Specifications
97/05/21	EPA	ASCW-BE	Ltr Draft Comprehensive ROD (Feb 97), DDRW, FFA Schedule

Administrative Record File Index - DDJC Tracy (Continued)

Date	Author	Addressee	Subject
97/06/05	Radian	COE, H	Well Monitoring Program Quarterly Monitoring Report First Quarter 1997 Sampling Round (DDRW-Tracy-June 1997)
97/05/29	ASCW-BE	RWQCB	Ltr with Tracy Monitoring and Reporting Order No. 96 report for April 1997
96/11/21	Kvaerner Davy	COE, S	Technical Proposal OU-1 Groundwater Treatment DDRW-Tracy
97/06/09	Radian	ASCW-BE	Ltr Second Quarter Analytical Results for Private Well & Tap Locations, Rose Property
97/06/13	Kvaerner Davy	COE, S	OU-1 Groundwater Treatment System, Performance Monitoring Report-Plant 1, May 1997
97/06/17	Radian	COE, H	Groundwater Treatment Systems Opr & Maintenance Monthly Update Report for May 1997
97/06/30	Radian	CoE, H	Draft Design Site Remediation for the Sewage & Ind. Waste Lagoons and the Waste Pipeline, Modification 1
97/06/27	Radian	COE, H	Draft Limited Squestration System Operation Engineering Technical Memorandum
97/06/25	ASCW-BE	Joe Rose	Ltr test results of PW 1 from April to June 1997
97/06/23	ASCW-BE	RWQCB	Ltr with Tracy Monitoring and Reporting Order No. 96 report for May 1997
97/06/25	Radian	COE, H	Information Repository Bioremediation Technology Evaluation Doc. Draft Technology Evaluation Work Plan
97/05/30	Radian	COE, H	Revised Work Plan Addendum-Sampling of EW 30C, OU-1 Well Installation (April 1996)

APPENDIX B

FIGURES

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APPENDIX C

SWMU 4 TECHNICAL MEMORANDA

TECHNICAL MEMORANDUM

Analysis of SWMU 4 - Storm Drain Lagoon
(DACA87-95-D-0001 Delivery Order 014)

SWMU 4 - Storm Drain Lagoon

Background

SWMU 4 is a storm water retention lagoon that collects all storm water runoff from DDRW-Tracy through a network of underground storm drains and open surface drainage ditches (see Figure C-1). Semivolatile organic compounds (SVOCs)-including polycyclic aromatic hydrocarbons (PAHs)-pesticides, and metals have been detected in the lagoon sediment. The Final Comprehensive Remedial Investigation/Feasibility Study (RI/FS) (Montgomery Watson, 1996a) identified SWMUs 2 and 3, SWMU 8, and SWMU 33 as the primary source areas for pesticides in groundwater; however, SWMU 4 was also considered a potential source area. Vadose zone modeling was performed and equilibrium partitioning limits were determined to develop cleanup standards to protect beneficial uses and background groundwater quality for SWMU 4. These results were the primary drivers for defining the scope of the remedial alternatives that were developed in the RI/FS. Radian has reevaluated the likelihood of impacts to groundwater from sediment and soil contamination at SWMU 4 using new subsurface soil results (collected just above the water table) and groundwater monitoring data (see discussion below).

The RI/FS also identified potential impacts to ecological receptors at SWMU 4. The potential impacts to ecological receptors were not a factor in determining the scope of excavation for the selected remedy. The contaminants responsible for the estimated risk were mingled with the contaminants responsible for water quality concerns and were addressed simultaneously through excavation to address the water quality impacts. As a result, a screening level assessment of the risk to ecological receptors was performed. The hazard index in the RI/FS was determined using literature values rather than site-specific data. Using a hazard index of 10, the screening-level assessment identified DDD, DDE, DDT, and selenium in the lagoon sediment as potential threats to ecological receptors. Human health is not threatened under either the depot worker or the construction worker scenario. The uncertainties of the risk assessment have now been reviewed (see below) and several assumptions were identified that are highly conservative.

Assessment of SWMU 4 as a Potential Source of Contamination in Groundwater

Although SWMU 4, the DDRW-Tracy storm water detention pond, cannot be dismissed as a potential source of contaminants in groundwater, there is little evidence that contaminants in the sediment or the soil beneath the pond have affected or will adversely affect groundwater. Because the concentrations of contaminants in the sediment and the soil beneath the storm water pond do not indicate a current threat to groundwater quality, no further action to protect groundwater quality is warranted at SWMU 4 (see Figures C-2a and C-2b for soil and sediment sampling results). This conclusion is supported by four points:

1. The October 1996 Subsurface Sampling Results Show That Migration from the Surface Sediment to the Subsurface Soil Is Minimal. The concentrations and numbers of analytes that exceed background or cleanup concentrations are much lower in the soil samples collected at 1 to 1.5 feet below the bottom of the pond than in the sediment samples collected from 0 to 6 inches below the bottom of the pond (see Table 1). The compounds that are present in the soil at concentrations greater than background levels (DDD and the PCB Arochlor 1260) have not been detected in groundwater samples from downgradient monitoring wells (LM004A and LM027AA). Dieldrin was detected above the practical quantitation limit (3 Ig/kg) in only one soil sample collected from deeper than 6 inches.

   The data from fourteen surface sediment samples (0 to 6 inches below the bottom of the pond) collected during the remedial investigation (Montgomery Watson, 1996a) and 18 subsurface soil samples collected above the water table (1 to 1.5 feet below the bottom of the pond) (Radian, technical memorandum, 27 November 1996) indicate that the number of compounds and their concentrations decrease with depth beneath the storm water pond. The surface sediment samples had one to five SVOCs reported; however, no SVOCs were reported in the subsurface soil samples. The PCB Arochlor 1260 was detected in eight surface sediment samples at concentrations of 41 to 459 Ig/kg; however, this contaminant was only detected in one of the 18 subsurface soil samples (at a concentration of 160 Ig/kg).

No urea-carbamate pesticides or chlorinated herbicides were reported in the subsurface soil samples. The pesticide DDD was detected in all the surface sediment samples at concentrations of 31 to 2,310 Ig/kg. Although this compound was detected in 14 of the 18 subsurface soil samples from 1 to 1.5 feet below the bottom of the pond, the concentrations ranged from 1.5 to 380 Ig/kg, and only four concentrations were above soil background concentrations (28.1 Ig/kg) for DDRW-Tracy. The concentrations of DDT, which was detected in four subsurface soil samples, and DDE, detected in ten subsurface soil samples, were all less than the soil background concentrations of 2,565 Ig/kg and 1,284 Ig/kg, respectively. Dieldrin was reported in four surface sediment samples and four subsurface soil samples; however, the highest reported concentration in the subsurface soil (6.5 Ig/kg) was less than the lowest concentration in the surface sediment samples.

2. DI-WET Results for Subsurface Soils Do Not Indicate Any Confirmed Impacts to Water Quality. One subsurface soil sample that had measurable concentrations of DDE (73 Ig/kg), DDD (380 Ig/kg), DDT (1.1 Ig/kg), and dieldrin (2.7 Ig/kg) was subjected to the waste extraction test with de-ionized water (DI-WET) to determine what fraction of the compounds may be leachable. Analyses of the leachate from the sample only showed reportable concentrations of DDE (0.13 Ig/L) and DDD (1.1 Ig/L). DDT and dieldrin concentrations were below reporting limits in the leachate. Although the leachate results suggest that there is potential for the frequently reported DDD and DDE to adversely affect groundwater, neither DDD nor DDE have been reported in any samples collected from LM004A and LM027AA, the wells closest to SWMU 4 in the downgradient direction.

3. Only Dieldrin Has Been Detected in Both Surface Sediment and Subsurface Soil Samples and in Downgradient Monitoring Wells. Only dieldrin (one of six samples from LM004A and one of 11 samples from LM027AA), monuron (two of four samples from LM027AA, none from LM004A), diuron (one of two samples from LM004A and three of four from LM027AA), simazine (one of one from LM027AA), and manganese (one of one from L14027AA) detections have indicated any adverse impact on groundwater. However, dieldrin is the only one of these compounds reported in the groundwater samples that was also reported above background levels in the surface sediment or subsurface soil samples from the pond.

4. Dieldrin Has Not Been Measured in Downgradient Wells Since 1994. Dieldrin has been detected in one of six LM004A groundwater samples and one of 11 LM027AA samples. In July 1993, a dieldrin concentration of 0.011 Ig/L was measured at LM004A. In 1995 and 1996, all dieldrin results were less than the reporting limit of 0.10 Ig/L Between 1987 and 1993, dieldrin concentrations at LM027AA ranged from less than 0.005 Ig/L (detection limit) to 0.11 Ig/L. All dieldrin results were less than the reporting limit (0.1 Ig/L) in 1995 and 1996.

Conclusion. The surface sediment, subsurface soil, soil leachate, and groundwater results suggest that SWMU 4 is not now, and is unlikely to be in the future, a source of contamination in groundwater. Although there has been an almost constant downward driving force of standing storm water in the pond, contaminant concentrations exceeding background levels in the sediment have not been driven into the groundwater in the 25 years that the pond has been used. It is not clear from the groundwater analyses that the dieldrin, monuron, and diuron detected in the groundwater samples can be attributed to the storm water pond. There is no clear evidence that the remediation of the soil at this site would have any effect on groundwater quality.

The cost of excavating all soils above cleanup standards based on equilibrium partitioning limits is estimated as $700,000. The above analysis shows that the benefits associated with excavation at SWMU 4 are doubtful and, therefore, funding excavation to address unlikely groundwater impacts is not warranted at this site.

Assessment of Impacts to Ecological Receptors

The Final Comprehensive Baseline Risk Assessment (Montgomery Watson, 1996a) provided a screening level assessment of the risk to ecological receptors at SWMU 4. Spotted sandpipers and great blue herons were identified as receptors with completed pathways at SWMU 4. DDT, DDE, DDD, and selenium were identified as contaminants of concern for ecological receptors at SWMU 4 (see Section 6.6.5 in the draft Record of Decision [Radian, July 1997]). Because of uncertainties in the assessment of ecological risk, the risk assessment does not provide a good basis for scoping a remedial action at SWMU 4. The following uncertainties were identified.

1. The Presence of Selenium Above Background Concentrations At SWMU 4 is Questionable. The risk assessment (Montgomery Watson, 1996a) indicated that the analytical results for selenium were uncertain. Six surface sediment samples with selenium results ranging from 15.5 to 31.3 mg/kg were considered questionable and reanalyzed by Montgomery Watson during the remedial investigation. When reanalyzed, five of these samples had no detectable selenium above a detection limit of 0.3 mg/kg, and the sixth sample had a selenium concentration of 1.83 mg/kg. Nevertheless, the 15.5 to 31.3 mg/kg levels were retained for the calculation of risk to ecological receptors. When Radian took subsurface soil samples in October 1996, the results for selenium in all subsurface soil samples were below the reporting limit. Because the subsurface soil samples were collected approximately 12 to 18 inches below where the sediment samples were collected, selenium may not be present above the background concentration in the sediment.

2. The Impacts of DDT, DDD, DDE, and Selenium on Ecological Receptors Are Probably Not as Severe as Estimated in the Risk Assessment. The calculation of exposure endpoints and the toxicity assessment used for the risk characterization relied on conservative estimates and literature values rather than site-specific data. Conservative uncertainty factors were applied to estimate chronic toxicity endpoints. The uncertainties in the risk characterization include the following:

    - It was assumed that 50% of the birds' diet of fish and invertebrates was consumed from SWMU 4. However, it is unlikely that birds do 50 percent of their feeding in the lagoons.

    - It was assumed that the great blue heron's diet was primarily fish. However, the fish population in SWMU 4 is unconfirmed. Also, the risk assessment used a very conservative bioaccumulation factor for carnivorous game fish that are not present in the pond.

    - The toxicity values and bioaccumulation factors used in the risk characterization were derived from the literature. A recalculation of the risk using site-specific data would almost certainly result in reduced chemical-specific cleanup standards.

Conclusion. Because of these and other uncertainties, the screening level ecological assessment does not provide a sound basis for remedial decisions about or scoping an excavation of SWMU 4.

Ambient Water Quality Criteria. Surface water concentrations in the pond for dieldrin and DDT exceed federal ambient water quality criteria (AWQC) for the protection of aquatic life. These criteria are applicable to storm water discharged from SWMU 4. The water quality criteria developed under the Clean Water Act Section 304 regulate "waters of the United States." The storm water detention pond is a human-made structure and does not impound any natural water body. Therefore, the AWQC apply to the discharge rather than to the pond itself.

Possible Modifications to the Selected Remedy for SWMU 4

Because there has been no indication of an impact to groundwater quality at SWMU 4, it is recommended that the cleanup standards for bis(2-ethylhexyl)phthalate, fluoranthene, phenanthrene, pyrene, carbaryl, carbofuran, total chlordane, and dieldrin be deleted (see Table 2, attached). The cleanup standards for each of these compounds were previously identified solely to protect groundwater quality.

To address potential ecological impacts at SWMU 4, the selected remedy could be modified to include the following:

1. Two detailed observations of the flora and fauna at the pond will be performed during the first year following the approval of the ROD. The assessments will be spaced approximately six months apart. More frequent observations to determine the frequency of occurrence of

the herons and sandpipers will supplement the two detailed assessments. These site assessments will provide a more accurate estimate of the level of food for the receptors and their use of it.

2. Following these assessments, the risk characterization in the Baseline Risk Assessment (BRA) will be reviewed. If sufficient invertebrates and fish are observed to warrant sampling, samples will be collected and site-specific toxicity values and bioaccumulation factors will be determined. The risk estimates will be revised using the site-specific data if sampling is performed.

3. Chemical-specific cleanup standards will be developed using the revised risk characterization to achieve a hazard index of 10.

Further actions at SWMU 4 are contingent on the results of the revised risk assessment for ecological receptors. If no sediment concentrations exceed the revised cleanup standards, then the remedy for SWMU 4 will consist of groundwater monitoring in accordance with the requirements of 23 CCR, Section 2550.6. If sediment concentrations exceed the revised cleanup standards, excavation will be implemented as a remedy at that time.

Five-year site reviews are required for the selected remedy, per CERCLA guidance, because contaminants will be left in place (organochlorine pesticides and dieldrin in the northern portion of the lagoon).

Table 1. Comparison of Sediment and Soil Results for Organic Constituents at SWMU 4

Compound	Detection Frequency in Surface Sediment	Concentration Range in Surface Sediment (Ig/kg)	Detection Frequency in Subsurface Soil	Concentration Range in Subsurface Soil (Ig/kg)
bis(2-Ethylhexyl)phthalate	7 of 18	NR to 10,000	0 of 18	NR
Fluoranthene	3 of 18	NR to 1,600	0 of 18	NR
Phenanthrene	2 of 18	NR to 1,700	0 of 18	NR
Pyrene	4 of 18	NR to 1,800	0 of 18	NR
Carbaryl	1 of 18	NR to 930	0 of 18	NR
Chlordane	4 of 18	NR to 828	0 of 18	NR
2,4-D	1 of 18	NR to 6.86	0 of 18	NR
Dieldrin	5 of 18	NR to 205	4 of 18	NR to 6.5
DDT	1 of 18	NR to 158	4 of 18	NR to 18
DDE	1 of 18	NR to 815	10 of 18	NR to 73
DDD	11 of 18	NR to 2,310	13 of 18	NR to 380
Selenium	4 of 18/1 of 18	NR to 31.3	0 of 18	NR

NR = none reported

Table 2. Chemical-Specific Cleanup Standards for SWMU 4

Chemical	Cleanup Standard In Draft ROD (Ig/kg)	Comments
bis(2-Ethylhexyl)phthalate	330	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). bis(2-Ethylhexyl)phthalate was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.
Fluoranthene	330	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Fluoranthene was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.
Phenanthrene	330	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Phenanthrene was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.
Pyrene	330	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Pyrene was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is riot required,
Carbaryl	550	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Carbaryl was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.

Table 2. (Continued)

Chemical	Cleanup Standard In Draft ROD (Ig/kg)	Comments
Carbofuran	1000	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Carbofuran was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.
Chlordane, total	20	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Chlordane was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.
2,4-D	25	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). 2,4-D was not detected in subsurface soil samples and has not been detected in LM004A or LM027AA. These data suggest the model was too conservative for this compound and a soil cleanup standard is not required.
Dieldrin	3	Modeling was used to establish a cleanup standard to protect water quality (standard corresponds to PQL). Dieldrin was detected in 4 of 18 subsurface soil samples. No dieldrin was detected in leachate from a DI-WET analysis performed on the most concentrated subsurface soil (1 to 1.5 Feet below the bottom of the pond). Dieldrin was periodically detected in LM004A and LM027AA prior to 1995. Since 1995, all results for dieldrin have been below the reporting limit. There is no clear link between the dieldrin concentrations previously detected in LM004A and LM027AA and SWMU 4. We recommend continued monitoring for dieldrin at LM004A and LM027AA with revised (lower) reporting limits, We recommend deleting the cleanup standard for dieldrin from the ROD and revisiting this issue in the five-year review of the site.

Table 2. (Continued)

Chemical	Cleanup Standard in Draft ROD (Ig/kg)	Comments
DDT	25	The cleanup standard for DDT was developed to attain a hazard index of 10 for the great blue heron using BRA data (Montgomery Watson, 1996). The BRA included a number of assumptions that were not site-specific. It is recommended that the ROD require some additional evaluation of impacts to ecological receptors and that the cleanup standard be recalculated using site-specific data.
DDE	50	The cleanup standard for DDE was developed to attain a hazard index of 10 for the great blue heron using BRA data (Montgomery Watson, 1996). The BRA included a number of assumptions that were not site-specific. It is recommended that the ROD require some additional evaluation of impacts to ecological receptors and that the cleanup standard be recalculated using site-specific data.
DDD	50	The cleanup standard for DDD was developed to attain a hazard index of 10 for the great blue heron using BRA data (Montgomery Watson, 1996). The BRA included a number of assumptions that were not site-specific. It is recommended that the ROD require some additional evaluation of impacts to ecological receptors and that the cleanup standard be recalculated using site-specific data.
Selenium	1,310	The cleanup standard for selenium was developed to attain a hazard index of 10 for the great blue heron using BRA data (Montgomery Watson, 1996). Selenium was initially detected in six sediment (0 to 6 inches below the bottom of the pond) samples during the remedial investigation. These same samples were reanalyzed and selenium was detected in only one of the six samples. Selenium was not detected in any of the subsurface soil (1 to 1.5 feet below the bottom of the pond) samples collected by Radian. The data for selenium are, therefore, highly suspect. It is recommended that the sediment be resampled for selenium. If the presence of selenium is confirmed, it is also recommended that the ROD require some additional evaluation of impacts to ecological receptors and that the cleanup standard be recalculated using site-specific data.

TECHNICAL MEMORANDUM

DDRW-Tracy Storm Water Pond Investigation
November 26, 1996

Summary

A hand auger investigation was performed at the DDRW-Tracy storm water pond to determine: 1) if soil contamination was present, and 2) if soil contamination is present to determine the extent of contamination (vertical and lateral), and the potential for contamination to migrate to groundwater. Eighteen samples were collected at various locations and analyzed for metals, semi-volatile organic compounds (SVOCs) pesticides and polychlorinated biphenyls (PCBs), urea and carbamate pesticides and chlorinated herbicides (see Figure 1). Metals, pesticides and PCBs were detected in samples collected, and one soil sample from each method (with the highest detected target analyte concentrations) was selected for additional analysis to determine metals and organic solubilities. Table 1 presents the analytical results for the soil samples that were collected during the investigation. No analytes were detected above the Soluble Threshold Limit Concentrations (STLC) which indicates leaching from the soil downward to groundwater is minimal.

Scope of work

The original scope of work included the collection of 18 soil samples at six boring locations within the stormwater collection pond. Soil samples were to be targeted for collection at depths of 1.0, 2.0, and 4.0 feet BGS (three samples per location). However, groundwater encountered at approximately 1.5 feet BGS prevented the collection of "dry" soil samples for chemical analyses, therefore, soil samples were collected just above groundwater at approximately 1.5 feet BGS in all 18 hand auger locations. The scope of work was revised (per CEHNC direction) and twelve additional soil sample locations were sampled within the pond. Samples were collected at the following locations to assess soil conditions:

Inlets (HP0101 and HP0102)

Low area (HP0104)

Area with minimal surface mixing (HP0103)

Locations randomly distributed throughout the pond (HP0105 through HP0118).

Field Activities

Samples were collected using a four-inch outer diameter hand auger. Field sampling procedures and equipment decontamination were performed in accordance to the Comprehensive Field Work Plan, Volume 1 of 2 (Radian, June 1996). Samples, were analyzed at CLS Laboratory in Rancho Cordova, California and at Radian Analytical Services Laboratory in Austin, Texas.

The field work was performed from 9 to 11 October 1996 by RUST Environmental and Infrastructure Corp. Eighteen (18) soil samples (HP0101 through HP0118) were collected at depths up to 1.5 feet BGS in the stormwater settling pond. Sample locations are shown on Figure 1. The hand augers were advanced to total depths ranging from approximately 1.5 feet BGS to 3 feet BGS. Soils encountered included silts and clays to approximately 1.5 feet BGS and sandy silts below 1.5 feet BGS. In each hand auger, one soil sample was collected from approximately 1.0 to 1.5 feet, directly above the saturated zone. A duplicate soil sample was collected at the inlet (HP0101 sample location), and the soil sample collected at HP0102 was assigned for a matrix spik-matrix spike duplicate analysis. All soil samples were analyzed in accordance with U.S. EPA Method SW8270 for SVOCs, Method SW8150 for chlorinated herbicides, Method SW8081 for organochlorine pesticides and PCBs, Method E632 for carbamate and urea pesticides, and Method SW6010 for metals. Following completion of investigation activities, the hand auger borings were backfilled with the native soil removed and each location was marked with a wooden stake.

Result

Of the five analytical methods performed on the soils collected at the storm water pond, target analytes were only detected in two of the methods; SW8081 for pesticides and PCBs and SW6010 for metals. Analytes were not detected above the laboratory reporting limit for Methods E632, SW8150 and SW8270.

Additional analysis for one sample from SW8081 and SW6010 were performed using a deionized water (DI WET) leaching procedure and the leachate analyzed by SW8081 and SW6010 analysis to determine the potential for solubility of target analytes. For pesticides and PCBs, sample HP0118 was selected for DI WET analysis based on the detection of 4,4'-DDD at 380 ug/kg, the highest detection of a regulated compound. For metals, sample HP0110 was selected for DI WET analyses because this sample had the highest concentrations of chromium, vanadium, and zinc. The majority of samples collected contained similar concentrations of detected metal analytes.

The DI WET analysis detected no analytes above the regulated hazardous waste limits for either metals or pesticides and PCBs, indicating a minimal potential for these contaminants to migrate towards groundwater.

Quality Assurance/Quality Control

Data validation and assessment for analytical data were performed in accordance to guidelines specified in the Comprehensive Field Work Plan, Volume 2 of 2, Quality Assurance Project Plan (Radian, June 1996). In summary, all of the data can be used to define constituents of concern at the DDRW-Tracy storm water pond. No data points were rejected and any limitations of specific data points for use are qualified as estimated results (noted with a J or UJ). A list of all qualified data points is presented in Table 2.

<SRC IMG 98030HR>
Figure 1. Storm Water Pond Sampling Locations DDRW-Tracy

Table 1, DDRW-Tracy
Storm Water Pond Sampling, October 1996

METHOD	SAMPLE IDENTIFICATION HP0101 Duplicate	HP0101	HP0102	HP0103	HP0104	HP0105	HP0106	HP0107	HP0108	HP0109	HP0110	HP0110 Leachata	HP0111	HP0112	HP0113	HP0114	HP0115	HP0116	HP0117	HP0118	HP0118 Leachate
E632																					
All Analytes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
SW8270																					
All Analytes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
SW8150	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
All Analytes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
SW8080 (ug/Kg)																					
4.4'-DDE	7.2	BRL	BRL	1.4	17	BRL	18	63	BRL	BRL	BRL	NA	3.2	6.5	3.4	BRL	2.7	BRL	BRL	73	0.00013
4.4'-DDD	29	3.2	BRL	1.6	17	BRL	44	340	2	1.5	BRL	NA	35	26	24	2.2	5.1	BRL	BRL	380	0.0011
Heptachlor Epoxide 1	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	NA	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL
Heptachlor Epoxide	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	NA	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL
Dieldrin	2	BRL	BRL	BRL	BRL	BRL	BRL	6.5	BRL	BRL	BRL	NA	BRL	1.7	BRL	BRL	BRL	BRL	BRL	2.7	BRL
4.4'-DDT	7.4	BRL	BRL	BRL	BRL	BRL	18	1.9	BRL	BRL	BRL	NA	BRL	BRL	BRL	BRL	BRL	BRL	BRL	1.1	BRL
Arochlor 1260	160	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	NA	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL
All Other analytes	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL
SW6010 (mg/Kg)																					
Aluminum	10200	8850	14700	7860	12600	12200	13200	9680	16500	15000	17900	3.94	10100	14400	9960	13700	10300	10200	11700	9870	NA
Antimony	1.71	1.09	1.14	1.33	1.67	0.907	1.23	1.38	1.27	1.14	1.42	0.00504	1.03	1.49	1.26	1.02	1.17	1.1	1.16	1.03	NA
Arsenic	4.27	4.16	4.92	4.7	4.56	6.33	7.12	3.14	7.1	7.43	6.67	0.00949	4.47	7.22	3.54	6.52	4.96	5.33	5.65	4.83	NA
Berlum	158	164	193	181	171	163	159	116	355	192	338	1.46	130	188	162	139	157	202	208	130	NA
Beryllium	0.618	0.422	0.574	0.334	0.575	0.542	0.584	0.413	0.661	0.662	0.696	0.00221	0.452	0.619	0.457	0.596	0.504	0.535	0.533	0.434	NA
Cadmium	0.454	0.328	0.431	0.294	0.633	0.462	0.523	0.343	0.471	0.486	0.418	<RL	0.254	0.437	0.425	0.372	0.248	0.264	0.252	0.244	NA
Calcium	3360	3070	4850	3000	6260	9870	4020	2790	10100	4890	28300	90	3310	3840	3180	3950	10400	8080	14500	3270	NA
Chromium	2.45	22.6	33.8	26.5	29	30.6	32.3	24.8	37.8	36.3	39.6	<RL	25.3	35.1	25.1	32.7	25.4	25.2	28.6	25.4	NA
Cobalt	8.1	7.42	10.4	7.34	10.6	10.07	10.9	6	13.1	12.3	11.9	<RL	8.71	11.9	7.43	11.3	8.64	9.7	9.48	7.29	NA
Copper	18.7	17.3	27	15	23.4	24.9	27	18	29.3	30.2	28.8	0.0238	17.6	28.1	18.7	25.8	19	22.5	22.1	18.9	NA
Iron	18700	17500	24500	19600	20500	22400	23400	16200	25700	26200	25700	0.644	18700	25100	17700	23600	19100	19500	20900	19200	NA
Lead	9.23	7.33	10.2	5.13	8.9	7.84	11.4	13.1	8.91	9.82	8.88	0.0107	6.07	10.4	7.82	8.77	6.39	8.03	7.21	9.59	NA
Magnesium	4730	4540	7080	4160	6060	6890	6820	4280	8040	7910	9160	10.8	4950	6880	4650	6670	5710	5900	6790	4440	NA
Manganese	257	241	301	216	296	478	498	179	622	422	526	0.546	292	282	206	448	281	327	407	306	NA
Nickel	27.6	27.2	38.2	24.7	33.9	36.9	39.1	25	42.7	43.9	41.9	<RL	29.1	41.7	27.4	40.7	30.1	32.5	33.2	27.1	NA
Potassium	1780	1530	2720	1510	1890	2040	2380	1760	2660	2850	2410	<RL	1700	2620	1820	2590	1790	1870	1750	1800	NA
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Silver	<DL	<DL	<DL	<DL	<DL	<DL	<DL	ND	<DL	<DL	<DL	<DL	<DL	ND	<DL	<DL	<DL	<DL	<DL	<DL	NA
Sodium	228	199	196	196	361	246	258	241	305	318	341	7.94	248	194	253	268	247	295	288	237	NA
Thallium	0.573	<DL	0.523	<DL	0.96	1.09	1.13	<DL	0.931	0.829	0.614	<DL	0.615	<DL	<DL	0.922	<DL	<DL	0.75	<DL	NA
Vanadium	41.2	36.9	43.9	51.2	46.3	39.4	39.8	37	47.9	45.4	51.8	0.041	40	45.3	39.3	41.5	37.7	36.2	40.4	40.4	NA
Zinc	52.8	44.6	55.2	37.1	94.9	48.8	55.8	59.6	56.4	57.7	56.8	0.195	41.6	60.7	57.2	56.8	40.9	48.4	45.9	42	NA

Leachate samples are in mg/L

BRL = Below reporting limit
NA = Not analyzed
ND = Not detected above the detection or reporting limit.
<RL = Below the reporting limit
<DL = Less than the detection limit

<IMG SRC 98030RI>
<IMG SRC 98030RJ>
<IMG SRC 98030RK>
<IMG SRC 98030RL>
<IMG SRC 98030RM>
<IMG SRC 98030RN>
<IMG SRC 98030RO>
<IMG SRC 98030RP>

Calculation of Clean-up Levels Protective of Ecological Receptors

This appendix provides the calculations performed to determine preliminary and conservative chemical-specific cleanup standards to protect ecological receptors. Concentrations were estimated using literature intake benchmarks. The total DDX concentrations were based on values from Heath, Spann, and Kreitzer (1969) and Anderson et al. (1975). Concentrations for selenium were based on intake values reported by Heintz, Hoffman, and Gold (1989). Lead concentrations were based on Edens et al. (1976) and Edens and Garlich (1983). The calculations were coordinated with and reviewed by Mr. Clarence Callahan of the U.S. EPA and were found to be reasonable.

<IMG SRC 98030RQ>
<IMG SRC 98030RR>
<IMG SRC 98030RS>
<IMG SRC 98030RT>
<IMG SRC 98030RU>

APPENDIX E

WELL MONITORING PROGRAM

E1.0 INTRODUCTION

E2.0 WELL MONITORING PROGRAM

Prior to completion of the Comprehensive Record of Decision (ROD), the purpose of the well monitoring program at DDJC-Tracy was to collect the groundwater data necessary for:

- Monitoring and tracking groundwater contamination;
- Validating the effectiveness of the groundwater extraction and treatment systems;
- Confirming that groundwater contaminants have not impacted potable wells within and downgradient from groundwater with concentrations exceeding aquifer cleanup levels; and
- Determining the effect of groundwater injection and percolation.

The selected remedy in the ROD includes groundwater monitoring at SWMUs and other areas of soil contamination. This monitoring adds two objectives to the well monitoring program:

- Determining if a SWMU or area of soil contamination is degrading groundwater; and
- Evaluating the appropriateness of the selected remedies.

E2.1 After an initial sampling period of one year, the frequency of sampling of wells in the monitoring program is determined by taking each well through an annual decision process that was introduced in the Environmental Master Plan, Version 1.0 (Radian, 1996e). Figure E-1 illustrates the decision process that is used to determine the sampling frequency in the well monitoring program after the initial one-year period. The purpose of the frequency decision flowchart is to reduce the monitoring to essential while continuing to meet the objectives of monitoring. The monitoring well sampling flowchart is divided into three criterion types: age, location, and data needs. The frequency decision process in Figure E-1 focuses sampling and analysis on obtaining data needed to assess the effectiveness of remediation systems and progress toward groundwater cleanup. In coordination with sampling frequency decisions for each well, decisions on the analyses to be performed should also be reviewed annually.

E2.2 The selection of analytical methods for each monitoring well is driven by the data needs at the location. Data needs for all DDJC-Tracy locations are driven by the following:

- Contaminants for which aquifer cleanup standards have been established; and
- Potential contaminants in the soils of known or suspected source areas.

E3.0 MONITORING WELL LOCATIONS

Monitoring wells located within or a short distance downgradient from a SWMU or other area of soil contamination have been identified as part of selected remedy. Figure E-2 illustrates well locations downgradient from SWMUs, Areas, and Drum Storage Areas with the same color as the area they are intended to monitor.

The Comprehensive RI/FS and ROD identifies four locations downgradient from SWMUs and the Drum Storage Area, Building 30 where additional wells should be located to monitor for contaminants that pose a threat to groundwater. Wells were installed in the four locations during October and November 1997. The locations of the newly installed wells and pre-existing wells relative to SWMUs and the Drum Storage Area are shown in Figure E-3.

<IMG SRC 98030RV>